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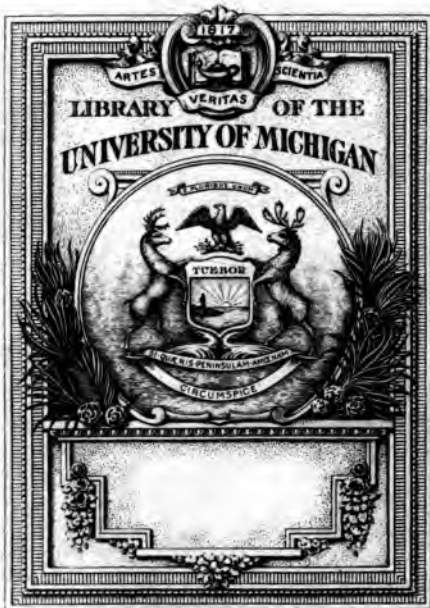
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THE
ECONOMIC WRITINGS
OF
SIR WILLIAM PETTY

London: C. J. CLAY AND SONS,
CAMBRIDGE UNIVERSITY PRESS WAREHOUSE,
AVE MARIA LANE.
Glasgow: 263, ARGYLE STREET.



Leipzig: F. A. BROCKHAUS.
New York: THE MACMILLAN COMPANY.
Bombay: E. SEYMOUR HALE.

I do perfectly approve of your conduct. Can
I bring my hands to strike you? I do not
wish to do so, and wish our hands were
fasted to the ends of our days. I do not
I gave the King a paper at Windsor, which
brought forth the names of the King and
that which was the subject of the
I do not see the way to make out of
the whole one subject which he would have
done and another which he would have done.



17
2
18

and command me within 24 hours, and with my own
sheet of paper to show him my further
thoughts concerning them: all was worry
taken but without getting Peter's wrong part
or hobnagles for my shoes, and poor
Newton with Corlany spect at the same
in the words, for I have not met w. B. one
that puts an extraordinary value upon his

Date to Southwell July 1687 from the Marquis of Lansdowne's MSS. at Bowood.

THE
ECONOMIC WRITINGS

OF

SIR WILLIAM PETTY

TOGETHER WITH THE
OBSERVATIONS UPON
THE BILLS OF MORTALITY

MORE PROBABLY BY
CAPTAIN JOHN GRAUNT



EDITED BY
CHARLES HENRY HULL, PH.D.
CORNELL UNIVERSITY

VOL. II

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AT THE UNIVERSITY PRESS

1899

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Tuesday, *June* 20. 1665.

At a Meeting of the Council of the
Royal Society.

Ordered,

THat the Observations upon the Bills of *Mortality* by
Mr. *John Graunt* be Printed by *John Martyn* and
James Allestry, Printers to the *Royal Society*.

BROUNCKER, Pres.

Natural and Political
OBSERVATIONS

Mentioned in a following INDEX,

and made upon the

Bills of Mortality.

B Y

Capt. JOHN GRAUNT,
Fellow of the *Royal Society*.

With reference to the *Government, Religion,*
Trade, Growth, Air, Diseases, and the several
Changes of the said CITY¹.

——— *Non, me ut miretur Turba, laboro,*
Contentus paucis Lectoribus.———

The Fifth Edition, much Enlarged².

L O N D O N,

Printed by *John Martyn*, Printer to the *Royal Society*,
at the Sign of the *Bell* in *St. Paul's Church-yard*.

MDCLXXVI.

¹ The title of the first edition (1662) ran, "Natural and Political Observations... By John Graunt, Citizen of London." etc. On the title-page of the third edition (1665) "Citizen of London" was superseded by "Fellow of the Royal Society" but the reference to "the said City" was retained.

² This phrase is retained from the title-page of the third edition. In the fifth edition nothing is new save the "further observations" and the Paris bills, pp. 141—146.

NOTE ON GRAUNT'S "OBSERVATIONS."

THE first edition of Graunt's *Observations upon the Bills of Mortality*¹ was published between 25 January, 1662, the date of the first epistle dedicatory, and 5 February, 1662, when Graunt presented fifty copies to the Royal Society to be distributed among its members². In the world outside Gresham College as well as among the Fellows of the Royal Society, Graunt's work soon attracted attention. Pepys bought a copy at Westminster Hall, the 24 March³, and the book proved so widely successful that a second edition was called for before the close of the year. With the return of the plague in the early summer of 1665, interest in the *Observations* revived. On the twentieth of June, at the same meeting at which the Council of the Royal Society recommended the Society to intermit their public weekly meetings until the present sickness should cease, it also ordered "that upon a report of Sir William Petty of his having perused the additions of Mr Graunt to his *Observations upon the Bills of Mortality*, the president be desired to license the reprinting of that book, together with such additions⁴." As the 4 July is the latest date in the "table shewing how many died weekly," it is probable that the new edition appeared before the 11 July. It certainly appeared before the 25 July, on which day Brouncker sent to Pepys⁵ a copy of the book, "new printed and enlarged." The enlargement of this third edition was effected chiefly by the addition of the appendix, the tables for Tiverton and Cranbrook, and the "table shewing how many died weekly"; the other changes, which are slight, are noted, in this reprint, where they occur. A "fourth impression," reprinted from the third, soon appeared at Oxford. The latest date in the weekly table of this edition is the 26 September,

¹ See Bibliography.

² Birch, I. 75.

³ *Diary*, II. 209-210.

⁴ Birch, II. 57.

⁵ *Diary*, v. 24.

and a copy of it in Cornell University Library bears the inscription "Ex dono Authoris Octob: 22^o 1665." No further edition was published during Graunt's life, but in 1676 a fifth edition was put out, it is said under Petty's supervision¹. To this, the completest edition, here reprinted, there were added "Some further Observations of Major John Graunt." Since 1676 the Observations have been printed but once in English, viz. in *A Collection of the Yearly Bills of Mortality from 1657 to 1758*, London: 1759, which speaks erroneously of "the sixth edition, in 1676." There is also an anonymous German translation² published at Leipzig in 1702.

Concerning the disputed authorship of the Observations see the Introduction. No MSS. of the book are known.

¹ Dr John Campbell in the *Biographia Britannica*, IV. 2262-2263, note. Dr Campbell's account of the earlier editions, however, is sadly incorrect.

² The translator was Dr Gottfried Schultz, born at Breslau 20 April, 1643, died there 14 May, 1698. Travel, says his eulogist, had made him master of many tongues, "non autem legisse tantum exterorum scripta ipsi sufficebat, sed ut aliorum etiam usibus prostarent, multoties Interpretem accuratum egit. Cum vero modestia insignis, qua ubique usus, nomen praefigere versionibus typis divulgandis vetaret, tale saltem in praesenti versionis Specimen exhibeo, de quo (cum in aliis dubius hæram) certo constat, ejus solertiam illud parasse. Scilicet Joannis Grauntii, Membri Societatis Regiae Anglicanae, Observationes Physicas et Politicas de Schedulis Mortalitatæ Londinensibus *Todten-Zetteln* Germanico Idiomate donavit, in gratiam eorum, qui propter commodum publicum passim in Germanicam similem computum desiderarunt."—*Memoria excellentissimi apud Vratislavienses polyhistori medici domini D. Godofriedi Schulzii quam posteris commendat Samuel Grass*, pp. 201-224 of the *Appendix ad Ephemeridum academiae Caesareo-leopoldinae nat. curiosorum in Germania centurias III. & IV.*, Noribergae, 1715.



TO THE
RIGHT HONOURABLE
JOHN Lord *ROBERTS*¹,
Baron of *Truro*, Lord *Privy Seal*,
and one of His Majesties 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 *Excerptions* 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.

¹ John Lord Roberts (or Robartes) was born in 1606. He was two years a student of Exeter College, Oxford, where, Wood intimates, he acquired from Prideaux those prepossessions which led him into the Army of the Commonwealth. At the Restoration, however, he received a number of honours and was made Lord Privy Seal in 1661. He became a member of the Royal Society in 1666 and in 1669 he was appointed Lord Lieutenant of Ireland to succeed Ormond, but was recalled in 1670. He was four times Speaker of the House of Lords and in 1679 he became Earl Radnor and Lord President of the Council, an office which he held almost until his death 17 July, 1685. He was uniformly considered an able but morose man. Wood, *Athenae Oxon.* II. 787; Doyle, *Official Baronage*, III. 91; Carte, *Ormond*, II. 378.

Moreover, to present your Lordship with tedious *Nar-rations*, were but to speak my own *Ignorance* of the *Value*, which His Majesty, and the Publick, have of your Lordship's Time. And in brief, to offer any thing like what is already in other Books, were but to derogate from your Lordships 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 succeed-||ed 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 publish'd, *Labours* unto your Lordship, as unto whose benign acceptance of some other of my *Papers*¹, 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 Lordships place, as they are of little or none to me, which is no more than the fairest *Diamonds* are to the *Fourneyemen Jeweller* that works them, or the poor *Labourer* that first digg'd 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 Majesties 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* are not a remedy to be purchased at vast inconveniences²: 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

¹ Wood says that Graunt also wrote "Observations on the advance of excise, and something about religion, but these two are not yet published." *Athensæ Oxon.* I. 311.

² The contagion being in the air, p. 350.

perhaps a Head too big for the Body¹, 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 fifth of the whole *Pyle*: That the old Streets are unfit for the present frequency of *Coaches*: || That the passage of *Ludgate* is a throat too streight 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 *Poll-money*², &c. Now, although your Lordship's most excellent Discourses have well informed me, That your Lordship is no stranger to 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 the Country *Air*, &c. 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 per-||usal 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 Accompts, and with how much affection and success, I am,

My Lord,

Birchen-lane,
25 *January*,
166 $\frac{1}{2}$.

Your Lordships most obedient,
and most faithful Servant,

JOHN GRAUNT. ||

¹ Sir Thomas Roe applied the same figure to London in a speech in Parliament in 1641. *Harl. Misc.*, IV. 433, 436.

² See *Treatise of Taxes*, note on p. 62.



To the Honourable

S^r *Robert Moray*¹, Knight, One of His Majesty's Privy Council for His Kingdom of *Scotland*, and *President* of the Royal Society of *Philosophers* meeting at *Gresham-Colledg*, 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 falln 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*²; and because I understand your selves 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,

¹ Sir Robert Moray (or Murray) was born about the beginning of the seventeenth century. He was educated at St Andrews and in France, and, being devoted to the royal cause, lived chiefly on the continent until the Restoration. He was one of the founders of the Royal Society and presided over its meetings from March 1661 to July 1662. Moray died 4 July, 1673.

² The History of Life and Death, or the second Title in natural and experimental History for the Foundation of Philosophy: being the third Part of the *Instauratio magna*. *Works*, x. 9—176.

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 Mathematicks of my Shop-Arithmetick. 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 my self, 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 my self as much to know who are Curatours of this or the other Experiment as to know who are Mareschals 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 Schismaticks 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 Hides¹) 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 Consorts, || and therefore cannot with patience hear, that your Labours about Vibrations, eminently conducing to both, should be slighted, nor your Pendula² called Swingswangs 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

¹ A ballad of twenty-eight stanzas, "In praise of the choice Company of Philosophers and Wittes who meet on Wednesdaies weekely at Gresham Colledge," is in Ashmole MS. 36, 37, f. 310—312. The first, fifteenth and seventeenth stanzas are:

If to bee rich, & to be learn'd
 Be every nations chiefest glory,
 How much are Englishmen concern'd
 Gresham to celebrate in story
 Who built th' Exchange t' enrich the City
 And Colledge founded for the Witty.

.....

A second hath described at full
 The Philosophy of making Cloth
 Tells you, what Grass doth make course Wooll
 And what it is that breeds the Moth
 Great learning is 'ith art of Clothing
 Though vulgar People think it nothing.

.....

A new designe how to make Leather
 A third Collegiate is now scanning
 The question's most debated whether
 Since without Barke there may be Tanning
 Some cheaper way may not be tryed
 Of making Leather without a Hyde.

² Petty was among those interested in the experiments upon pendulums which were made in January, 1662. Birch, I. 70, 74, also 46, 53.

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

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¹ 20 should be 22; there are several similar misprints in the index of original pages.

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55. *There being fourteen Males to thirteen Females, and Males being
prolific forty years and Females but twenty five, it follows, that
in effect there be 560 Males to 325 Females,* p. 67 [375]
56. *The said inequality is reduced by the latter marriage of the Males,
and their employment in Wars, Sea-voyages, and Colonies,* *ibid.* [375]
57. *Physicians have two Women Patients to one Man; and yet more
Men die than Women,* *ibid.* [376]
58. *The great emission of Males into the Wars out of London Anno 1642
was instantly supplied,* p. 68 [376]
59. *Castration is not used only to meliorate the flesh of Eatable Animals,
but to promote their increase also,* p. 69 [377]
60. *The true ratio formalis of the evil of Adulteries and Fornications,*
p. 70 [377]
61. *Where Polygamy is allowed, Wives can be no other than Servants,*
ibid. [378] ||
62. *That ninety seven, and sixteen Parishes of London are in twenty
years increased from seven to twelve, and in forty years from twenty
three to fifty two,* p. 72 [379]
63. *The sixteen Parishes have increased farther than the ninety seven,
the one having increased but from nine to ten in the said forty years,*
p. 73 [379]
64. *The ten Out-Parishes have in fifty four years increased from one
to four,* p. 75 [380]
65. *The ninety seven, sixteen, and ten Parishes have in fifty four years
increased from two to five,* *ibid.* [380]
66. *What great Houses within the Walls have been turned into
Tenements,* p. 76 [380]
67. *Cripplegate-Parish hath most increased, &c.* p. 77 [380]
68. *The City removes Westwards, with the reasons thereof,* *ibid.* [381]
69. *Why Ludgate is become too narrow a throat for the City,* *ibid.* [381]
70. *That there be some Parishes in London two hundred times as big
as others,* *ibid.* [382]
71. *The natural bigness and Figure of a Church for the Reformed
Religion,* p. 78 [382]
72. *The City of London and Suburbs, being equally divided, would
make 100 Parishes, about the largeness of Christ-Church, Black-friers,
or Colemanstreet,* *ibid.* [383] ||
73. *There are about 24000 Teeming women in the ninety seven, sixteen,
and ten Parishes in and about London,* p. 81 [384]
74. *That about three die yearly out of eleven Families containing each
eight persons,* *ibid.* [385]
75. *There are about 12000 Families within the walls of London,*
p. 83 [385]

76. *The housing of the sixteen and ten Suburb-Parishes is thrice as big as that of the ninety seven Parishes within the walls,* *ibid.* [385]
77. *The number of souls in the ninety seven, sixteen, and two out-Parishes is about 384000,* *ibid.* [386]
78. *Whereof 199000 are Males, and 185000 Females,* *ibid.* [386]
79. *A Table shewing of 100 quick conceptions how many die within six years, how many the next Decad, and so for every Decad till 76,*
p. 84 [387]
80. *Tables, whereby may be collected how many there be in London of every Age Assign'd,* *ibid.* [387]
81. *That there be in the 97, 16, and ten Parishes near 70000 Fighting Men, that is, Men between the Ages, of 16, and 56,* p. 85 [387]
82. *That Westminster, Lambeth, Islington, Hackney, Redriff, Stepney, Newington, contain as many people as the 97 Parishes || within the walls, and are consequently $\frac{1}{3}$ of the whole Pile,* *ibid.* [387]
83. *So that in, and about London are about 81000 Fighting men, and 460000¹ in all,* *ibid.* [387]
84. *Adam and Eve in 5610 years might have by the ordinary proportion of Procreation, begotten more people, than are now probably upon the face of the earth,* p. 86 [388]
85. *Wherefore the World cannot be older than the Scriptures represent it,* *ibid.* [388]
86. *That every Wedding one with another produces four Children,*
p. 87 [388]
87. *That in several places the proportion between the Males and Females differ,* *ibid.* [389]
88. *That in ninety years there were just as many Males as Females Buried within a certain great Parish in the Country,* *ibid.* [389]
89. *That a Parish, consisting of about 2700 Inhabitants, had in 90 years but 1059 more Christnings, than Burials,* p. 88 [389]
90. *There come yearly to dwell at London about 6000 strangers out of the Countrey, which swells the Burials about 200 per Annum,*
ibid. [389]
91. *In the Country there have been five Christnings for four Burials,*
p. 89 [390]
92. *A Confirmation, that the most healthful years are also the most fruitful,* *ibid.* [390] ||
93. *The proportion between the greatest, and least mortalities, in the Country are greater than the same in the City,* p. 91 [391]
94. *The Countrey Air more capable of good, and bad impressions, than that of the City,* p. 92 [392]

¹ The calculation of a total population of 460000 is not made in the text at p. 387, but that estimate is used at pp. 371, 399, 400 and 401.

95. *The difference also of Births are greater in the Countrey, than at London,* p. 93 [392]
96. *In the Countrey but about one of fifty dies yearly, but at London one of thirty, over and above the Plague,* ibid. [393]
97. *London not so healthful now as heretofore,* p. 94 [393]
98. *It is doubted whether increase of people, or the burning of Sea-Coal were the cause, or both,* p. 95 [394]
89. *The Art of making of Gold would be neither benefit to the World, or the Artist,* p. 97 [395]
100. *The Elements of true Policy are to understand throughly the Lands, and hands of any Countrey,* p. 98 [395]
101. *Upon what considerations the intrinsick value of Lands doth depend,* ibid. [396]
102. *And in what the Accidental,* p. 99 [396]
103. *Some of the few benefits of having a true Accompt of the people,* ibid. [396]
104. *That but a small part of the whole people are employed upon necessary affairs,* ibid. [396]||
105. *That a true Accompt of people is necessary for the Government, and Trade of them, and for their peace and plenty* p. 100 [397]
106. *Whether this Accompt ought to be confined to the Chief Governours,* ibid. [397]||
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THE
P R E F A C E.

*H*AVING 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 judg of the necessity of their removal, and Trades-men 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 Accompts, 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 my self with as much matter of that kind, even as the Hall of the Parish-Clarks 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

Christnings, 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 knowledg of the same would bring to the World; that I might not engage my self in idle, and useless Speculations: but, (like those Noble Virtuosi of Gresham-Colledg, who reduce their subtile 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 Premisses, 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 Ta-||bles, whereby all men may both correct my Positions, and raise others of their own. For herein, I have, like a silly School-boy, coming to say my Lesson to the World (that Peevish, and Tetchy Master) brought a bundle of Rods, wherewith to be whip'd for every mistake I have committed. ||



(1)

Natural and Political
OBSERVATIONS, &c.

CHAP. I.

*Of the Bills of Mortality, their beginning, and progress.*¹

THE first of the continued Weekly *Bills of Mortality* extant at the *Parish Clerks Hall*², begins the Twenty ninth of *December* 1603, being the first year of King *James* his Reign; since when a weekly *Accompt* hath been kept there of *Burials* and *Christnings*. It is true, There were *Bills* || before, *viz.* for the Years 1592, -93, -94; but so ⁽²⁾ interrupted since, that I could not depend upon the sufficiency of them, rather relying upon those *Accompts*, 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 *Accompts* was taken from the *Plague*: for the said *Bills* (for ought appears) first began in the said year 1592, being a time of great *Mortality*; and, after some disuse, were resumed again

¹ On the history of the London bills of mortality see the Introduction.

² Maitland, writing before 1739, could not find the part of the *Parish Clerks' register* for the years before 1664. He records that "the Company are of the opinion that the same was lent to Mr Graunt, to enable him to write his *Natural and Political Observations*, and by some accident never returned." *History of London*, II. 738.

in the year 1603, after the great *Plague* then happening likewise¹.

3. These *Bills* were printed and published, not only every Week on *Thursdays*, but also a general *Accompt* of the whole Year was given in upon the *Thursday* before *Christmas-day*: which said general *Accompts* have been presented in the several manners following, *viz.* from the Year 1603, to the Year 1624, *inclusivè*, according to the Pattern here inserted².

1623.

1624.

(3) *The general Bill for the whole Year, of all the Burials and Christnings, 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 be-||longing to the same: from Thursday the 18. of December 1623, to Thursday the 16. of December, 1624, according to the Report made to the King's most Excellent Majesty by the Company of the Parish-Clerks of London.*

B	Uried this Year in the Fourscore and seventeen	}	3386
	Parishes of <i>London</i> within the Walls,		
	Whereof of the <i>Plague</i> ,	}	1

¹ Graunt's conjecture of a connection between the *Plague* and the origin of the bills is confirmed by their earlier history. Cf. Introduction, also Creighton, *Epidemics*, I. 294—295, Ogle in *Jour. of the Stat. Soc.*, LV. 438.

² A printed weekly bill for 5—12 November, 1607, a MS. weekly bill for 10—17 August, 1609, and a blank form for a weekly bill with printed date of 1610 are preserved at the Record Office. *State Papers, Dom.*, James I., XXVIII. 89; XLVII. 85—86; LVIII. 102. All vary in unimportant particulars from the pattern of a yearly bill which Graunt gives. The bill of 1607 lacks the entry of those buried of the plague without the liberties in Middlesex and Surrey, the bill of 1609, though it gives them does not include them in its total burials, while the form for a bill dated 1610 both includes them in its total and also omits to enter separately "the whole sum of all the burials in London and the liberties thereof." The MS. bill of 1609 is further peculiar in that it consists of two independent parts. The second part is devoted to the nine out parishes enumerated by Graunt on p. 341 below. These parishes the bill locates "in Westminster," and the first part omits their figures in making up the total of burials.

Buried this Year in the Sixteen Parishes of <i>London</i> ,	}	5924
and the <i>Pesthouse</i> , being within the Liberties, and without the Walls,		
Whereof, of the Plague,	}	5
The whole Sum of all the Burials in <i>London</i> , and the Liberties thereof, is this Year	}	9310
Whereof, of the Plague,	}	6
Buried of the Plague without the Liberties, in <i>Middlesex</i> and <i>Surrey</i> , this whole Year,	}	0
Christened in <i>London</i> , and the Liberties thereof, this Year;	}	6368
Buried this Year in the Nine out-Parishes, adjoining to <i>London</i> , and out of the Freedom,	}	2900
Whereof, of the Plague,	}	5
The Total of all the Burials in the places aforesaid is	}	12210 (4)
Whereof, of the Plague,	}	11
Christened in all the aforesaid places this Year,	}	8299
Parishes clear of the Plague,	}	116
Parishes that have been Infected this Year,	}	6

4. In the Year 1625, every Parish was particularized¹, 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 16. day of December, 1624. to Thursday the 15. day of December, 1625. according to the Report || made to the King's most Excellent Majesty by (5) the Company of Parish Clerks of London.

¹ In the weekly bills, at least, every parish was particularized as early as 1532. See Introduction.

<i>LONDON,</i>		<i>Bur.</i>	<i>Plag.</i>
A Lbanes in Woodstreet		188	78
Alhallows Barking		397	263
Alhallows Breadstreet		34	14
Alhallows the Great		442	302
Alhallows Hony-lane		18	8
Alhallows the Less		259	205
Alhallows in Lombard-street		86	44
Alhallows Stainings		183	138
Alhallows the Wall		301	155
Alphage Cripple-gate		240	190
Andrew-Hubbard		146	101
Andrews Undershaft		219	149
Andrews by Wardrobe		373	191
Anns at Aldersgate		196	128
Anns Black-Fryers		336	215
Antholins Parish ¹		62	31
Austins Parish ²		72	40
Bartholomew at the Exchange		52	24
Bennets Fink ³		108	57
Bennets Grace Church		48	14
Bennets at Pauls Wharf		226	131
Bennets Shearhog		24	8
Botolphs Billings-gate		99	66
Christ's-Church Parish		611	371
(6) Christophers Parish		48	28
Clements by Eastcheap		87	72
Diony's Back-Church		99	59
Dunstans in the East		335	225
Edmunds Lumbardstreet		78	49
Ethelborow in Bishops-gate		205	101
St. Faiths		89	45
St. Fosters ⁴ in Foster-lane		149	102
Gabriel Fen-Church		71	54
George Botolphs-lane		30	19
Gregories by Pauls		296	196

¹ Properly St Anthony.² Properly St Augustin.³ Properly St Benedict.⁴ Otherwise St Vedast.

Yearly Bill for 1625.

339

<i>LONDON,</i>	<i>Bur.</i>	<i>Pl.</i>
Hellens in Bishops-gate street	136	71
James by Garlick-hith	180	109
John Baptist	122	79
John Evangelist	7	0
John Zacharies	143	97
James Dukes-place	310	154
Katherine Colemanstreet	26	175
Katherine Cree-Church	886	373
Lawrence in the Jewry	91	55
Lawrence Pountney	206	127
Leonards Eastcheap	55	26
Leonards Foster-lane	292	209
Magnus Parish by the Bridge	137	85
Margarets Lothbury	114	64
Margarets Moses	37	25
Margarets new Fishstreet	123	82
Margarets Pattons	77	50
Mary Ab-Church	98	58 (7)
Mary Aldermanbury	126	79
Mary Aldermary	92	54
Mary le Bow	35	19
Mary Bothaw	22	14
Mary Coal-Church	26	11
Mary at the Hill	152	84
Mary Mounthaw	76	58
Mary Sommerset	270	192
Mary Stainings	70	44
Mary Woolchurch	58	35
Mary Woolnoth	82	50
Martins Ironmonger-lane	25	18
Martins at Ludgate	254	164
Martins Orgars	88	47
Martins Outwich	60	30
Martins in the Vintry	339	208
Matthew Friday-street	24	11
Maudlins in Milk-street	401	23
Maudlins Old-fish-street	225	142

<i>LONDON,</i>		<i>Bur.</i>	<i>Pl.</i>
	Michael Bassishaw	199	139
	Michael Cornhill	159	79
	Michael Crooked lane	144	91
	Michael Queen-hith	215	157
	Michael in the Quern	53	30
	Michael in the Royal	111	61
	Michael in Wood-street	189	68
	Mildreds Bread-street	60	44
(8)	Mildreds Poultry	94	45
	Nicholas Acons	33	13
	Nicholas Coal-Abby	87	67
	Nicholas Olaves	70	43
	Olaves in Hart-street	266	195
	Olaves in the Jewry	43	25
	Olaves in Silver-street	274	103
	Pancras by Soper-lane	17	8
	Peters in Cheap	68	44
	Peters in Cornhill	318	78
	Peters at Pauls Wharf	97	68
	Peters Poor in Broad-street	52	27
	Stevens in Coalman-street	506	350
	Stevens in Walbrook	25	13
	Swithins at London-stone	99	60
	Thomas Apostles	141	107
	Trinity Parish	148	87

Buried within the 97 Parishes within the Walls } 14340
of all Diseases }

Whereof of the Plague } 9197 ||

(9)		<i>Bur.</i>	<i>Plag.</i>
	Andrews in Holborn	2190	1636
	Bartholomew the Great	516	360
	Bartholomew the Less	111	65
	Brides Parish	1481	1031
	Botolph Algate	2573	1653
	Bridewel Precinct	213	152

Yearly Bill for 1625.

341

	<i>Bur.</i>	<i>Pl.</i>
Botolphs Bishops-gate	2334	714
Botolphs Alders-gate	578	307
Dunstans the West	860	642
Georges Southwark	1608	912
Giles Cripplegate	3988	2338
Olaves in Southwark	3689	2609
Saviours in Southwark	2746	1671
Sepulchres Parish	3425	2420
Thomas in Southwark	335	277
Trinity in the Minories	131	87
At the Pesthouse	194	189

*Buried in the 16 Parishes without the Walls,
standing part within the Liberties, and part
without, in Middlesex, and Surrey, and at the
Pest-house,* } 26972
Whereof, of the Plague } 17153||

Buried in the Nine out Parishes.

[10]

	<i>Bur.</i>	<i>Plag.</i>
Clements Temple-bar	1284	755
Giles in the Fields	1333	947
James at Clarken-well	1191	903
Katherins by the Tower	998	744
Leonards in Shoreditch	1995	1407
Martins in the Fields	1470	973
Mary White-chapel	3305	2272
Magdalens Bermondsey	1127	889
Savoy Parish	250	176

*Buried in the Nine out Parishes, in Middlesex and
Surrey,* } 12953
Whereof of the Plague, } 9067

*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 Pest-house,* } 54265

<i>Whereof, Buried of the Plague, this present year, is</i>	} 35417
<i>Christnings this present year, is</i>	} 6983
<i>Parishes clear this year, is</i>	} 1
<i>Parishes infected this year, is</i>	} 121

- (11) 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 <i>Westminster</i> this Year	{ <i>Buried</i>	471
	{ <i>Plague</i>	13
	{ <i>Christnings</i>	361

6. In the Year 1629, an Account of the *Diseases* and *Casualties*, whereof any dyed, together with the distinction of *Males* and *Females*, making the sixth Canton of the Bill, was added in manner following.¹

The Canton of Casualties; and of the Bill for the Year 1632, being of the same form with that of 1629. ||

- (12) *The Diseases and Casualties this Year, being 1632.*

A Bortive and Stilborn	415
A Affrighted	1
Aged	628
Ague	43
Apoplex and Meagrim	17
Bit with a mad Dog	1
Bleeding	3

¹ The diseases and casualties were reported to the Parish Clerks as early as 1604. Bell, *London's Remembrancer*, unpagged, Graunt, p. 346. Upon the back of the weekly bill for 5—12 November, 1607, the deaths due to each of twenty-one causes are enumerated in MS., and in the bill for 10—17 August, 1609, similar information is given, likewise in MS., for the parishes severally, e.g. :

"Katharines Creechurch. pla. 1 crism 1 small pox 2 fever 1 5 1." The last two figures occupy the columns uniformly reserved for total burials and for burials of the plague respectively.

Bloody flux, Scowring, and flux,	348	
Bruised, Issues, Sores, and Ulcers,	28	
Burnt and Scalded	5	
Burst and Rupture	9	
Cancer and Wolf	10	
Canker	1	
Childbed	171	
Chrisomes and Infants	2268	
Cold and Cough	55	
Colick, Stone, and Strangury	56	
Consumption	1797	
Convulsion	241	
Cut of the Stone	5	
Dead in the street, and starved	6	
Dropsie and Swelling	267	
Drowned	4	
Executed and Prest to death	38	
Falling Sickness	17	(13)
Fever	1108	
Fistula	13	
Flox and Small Pox	531	
French Pox	12	
Gangrene	5	
Gout	4	
Grief	11	
Jaundies	43	
Jaw-faln	78	
Imposthume	44	
Kill'd by several accidents	6	
King's Evil	38	
Lethargy	2	
Livergrown	87	
Lunatick	5	
Made away themselves	15	
Measles	80	
Murthered	7	
Overlaid, and starved at Nurse	7	
Palsie	25	

	Piles	1
	Plague	8
	Planet	13
	Pleuresie and Spleen	36
	Purples and Spotted Fever	38
	Quinsie	7
	Rising of the Lights	98
	Sciatica	1
(14)	Scurvy and Itch	9
	Suddenly	62
	Surfet	86
	Swine Pox	6
	Teeth	470
	Thrush and Sore-mouth	40
	Tympany	13
	Tissick	34
	Vomiting	1
	Worms	27

Christned	{	Males	4994	Buried	{	Males	4932
		Females	4590			Females	4603
		In all	9584			In all	9535
				Whereof, of the Plague			8

Increased in the Burials in the 122 Parishes, and at the Pest-house this year, } 993¹
 Decreased of the Plague in the 122 Parishes, and at the Pest-house this year, } 662²

7. In the Year 1636, the Accompt of the *Burials* and *Christnings*, in the Parishes of *Islington*, *Lambeth*, *Stepney*, *Newington*, *Hackney*, and *Redriff* were added³ in the manner following, making a seventh Canton, *viz.* ||

(15)	<i>In Margarets</i> <i>Westminster</i>	{	Christned	440
			Buried	890
			Plague	0

¹ This should be 973 to correspond with the tables at pp. 408 and 411, since both of them put the total burials for 1631 at 8562.

² Probably a misprint for 266, which the first edition had. The plague burials, according to the table, p. 408 were 274 in 1631 and 8 in 1632.

³ In the bill for 21 April, see table, p. 426.

<i>Islington</i>	{ Christned	36
	{ Buried	113
	{ Plague	0
<i>Lambeth</i>	{ Christned	132
	{ Buried	220
	{ Plague	0
<i>Stepney</i>	{ Christned	892
	{ Buried	1486
	{ Plague	0
<i>Newington</i>	{ Christned	99
	{ Buried	181
	{ Plague	0
<i>Hackney</i>	{ Christned	30
	{ Buried	91
	{ Plague	0
<i>Redriff</i>	{ Christned	16
	{ Buried	48
	{ Plague	0
<i>The Total of all the Burials in the seven last Parishes this Year</i>		2958
<i>Whereof, of the Plague,</i>		0
<i>The Total of all the Christ- nings,</i>		1645

8. *Covent-Garden* being made a Parish¹, the Nine out (16) 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 entred 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*,

¹ The Act erecting the parish of St Paul, Covent Garden, passed the House of Commons 7 January, 1645. *Commons' Journal*, IV. 398.

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 any one 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 Corps lies, and by view of the same, and by other enquiries, (17) they examine by what *Disease* or *Casualty* the Corps died. Hereupon they make their Report to the *Parish Clerk*, and he, every *Tuesday* night, carries in an Accompt of all the *Burials* and *Christnings* happening that Week, to the *Clerk* of the *Hall*. On *Wednesday* the general Accompt is made up and printed, and on *Thursday* 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 aforementioned, 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.

[CHAP. II.]¹

General Observations upon the Casualties.

I N 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 This line, omitted from the fifth edition, occurs in the first four.

1. There seems to be good reason, why the *Magistrate* should himself take notice of the || numbers of *Burials* and ⁽¹⁸⁾ *Christnings*, viz. to see whether the City increase or decrease in People; whether it increase proportionably with the rest of the Nation; whether it be grown big enough, or too big, &c. 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 every body, why the Accompt of *Casualties* (whereof we are now speaking) is made? The reason, which seems most obvious for this later, 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 Accompts of *Epidemical Diseases*, and upon the chief. of them all, the *Plague*; wherefore the mention of the rest seems only matter of curiosity.

4. But to this we Answer, That the knowledge even of the numbers which dye of the *Plague*, is not sufficiently deduced from the meer Report of the *Searchers*, which only the Bills afford; but from other Ratiocinations, || and com- ⁽¹⁹⁾ parings of the *Plague* with some other *Casualties*.

5. For we shall make it probable¹, that in the Years of *Plague*, a quarter part more dies of that *Disease* than are set down; the same we shall also prove by other *Casualties*. Wherefore, if it be necessary to impart to the world a good Accompt of some few *Casualties*, which since it cannot well be done without giving an Accompt 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 of 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 *Stilborn*; whether men

¹ See p. 365.

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 hereupon¹) I say, that (20) these Distin-||guishments 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 Corps 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 seventy five 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 matters 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 signifie, 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*, &c. or were choaked with *Phlegm*, or else of *Teeth*, *Convulsion*, and *Scouring*, 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 ||.

(21) 9. I say, it is enough, if we know from the *Searchers* but the most predominant Symptoms; as that one died of the *Headach*, 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*, &c.

¹ "For both the common phrases of physicians concerning Radical Heat and Natural Moisture are deceptive." Bacon, x. 11.

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, Lunatics, Sores, Small-pox, &c.* their own senses are sufficient, and the generality of the World are able pretty well to distinguish the *Gout, Stone, Dropsie, Falling sickness, Palsie, Agues, Pleuresie, Rickets*, 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 Years¹ || there dying of all Diseases and Casualties 229250, (22) that 71124² died of the *Thrush, Convulsion, Rickets, Teeth and Worms*; and as *Abortives, Chrysomes, Infants, Livergrown, and Overlaid*; that is to say, that about $\frac{1}{3}$ 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*, 12210³, of which number we suppose likewise, that about $\frac{1}{2}$ might be Children under six years old. Now, if we consider that sixteen⁴ of the said 229250 died of that extraordinary and grand Casualty, the *Plague*, we shall find that about thirty six *per Centum* of all quick conceptions died before six years old.

14. The second Observation is, That of the said 229250 dying of all Diseases, there died of *acute* Diseases, (the *Plague* excepted) but about 50000, or $\frac{2}{5}$ parts. The which proportion

¹ The years are 1629—1636, and 1647—1658, see the Table of Casualties, p. 406.

² These figures do not correspond to Graunt's table (p. 406) which gives thrush 211, convulsion 9,073, rickets 3,681, teeth and worms 14,236, abortive and still-born 8,559, chrisoms and infants 32,106, liver-grown, spleen, and rickets 1,421, overlaid and starved at nurse 529, or in all but 69,816.

³ According to the table (p. 406) there died of swine-pox 57, of flox and small-pox 10,576, of measles 757, of worms (without convulsions) 830, or in all 12,220.

⁴ That is, sixteen thousand; according to the table (p. 406), 16,384.

doth give a measure of the State, and disposition of this *Climate* and *Air* as to health; these *acute* and *Epidemical* Diseases happening suddenly and vehemently, upon the like corruptions and alterations in the *Air*. ||

- (23) 15. The third Observation is, That of the said 229250, about seventy¹ died of *Chronical* 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 *Epidemical* Diseases shews the aptness of the *Air* to sudden and vehement Impressions; so the *Chronical* Diseases shew the ordinary temper of the place: so that upon the proportion of *Chronical* Diseases seems to hang the judgment of the fitness of the Country for *long life*. For, I conceive, that in Countries subject to great *Epidemical* sweeps, men may live very long, but, where the proportion of the *Chronical* distempers is great, it is not likely to be so; because men being long sick, and alwaies 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 229250, not 4000 died of outward Grievs, as of *Cancers*, *Fistula's*, *Sores*, *Ulcers*, *broken and bruised Limbs*, *Imposthumes*, *Itch*, *King's* (24) *Evil*, *Leprosie*, *Scald-head*, || *Swine Pox*, *Wens*, &c. viz. not one in sixty.

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 229250, those persons may the better understand the hazard they are in.

¹ That is, seventy thousand. The German translator of the *Observations* writes "70 vom hundred."

Table of notorious Diseases.

Apoplex	1306
Cut of the Stone	38
Falling Sickness	74
Dead in the Streets	243
Gout	134
Head-ach	51
Jaundice	998
Lethargy	67
Leprosie	6
Lunatick	158
Overlaid and Starved	529
Palsie	423
Rupture	201
Stone and Strangury	863
Sciatica	5
Suddenly	454

Table of Casualties.

(25)

Bleeding	69
Burnt and Scalded	125
Drowned	829
Excessive drinking	2
Frighted	22
Grief	279
Hanged themselves	222
Kill'd by several accidents	1021
Murdered	86
Poysoned	14
Smothered	26
Shot	7
Starved	51
Vomiting	136

18. In the foregoing Observations we ventured to make a Standard of the healthfulness of the *Air* from the proportion of *acute* and *Epidemical* Diseases, and of the wholsomness of

the food, from that of the *Chronical*. Yet, for as 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, (26) *viz.* 15757 to the Total 229250. 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 *Chronical* Diseases, and the Diseases whereunto the City is most subject; as for Example, *Consumptions*, *Dropsies*, *Faundice*, *Gout*, *Stone*, *Palsie*, *Scurvy*, *Rising of the Lights* or *Mother*, *Rickets*, *Aged*, *Agues*, *Fevers*, *Bloody Flux* and *Scouring*: nay, some Accidents, as *Grief*, *Drowning*, *Men's making away themselves*, and being *Kill'd by several Accidents*, &c. do the like; whereas *Epidemical* 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. ||

(27)

CHAP. III.

Of Particular Casualties.

1. MY first Observation is, that few are *starved*. This appears, for that of the 229250, which have died, we find not above fifty one to have been *starved*, excepting helpless *Infants* at Nurse, which being caused rather by carelessness, ignorance, and infirmity of the Milch-women, 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 number 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 Impotencies, || or taught to ⁽²⁸⁾ work, &c. 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 general Tax; and consequently, the Objects of Charity would be removed and taken away.

4. To which we Answer, That in *Holland*, although no where fewer Beggars appear to charm up commiseration in the credulous, yet no where is there greater or more frequent Charity: only indeed the Magistrate is both the *Beggar*, and the *Disposer* of what is got 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 alwaies 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 our selves a kind of pain and passion by consent, of which we ease our selves, when we think we ease them, with whom we sympathised; or else we bespeak beforehand the like commiseration in || others towards our selves, when we shall ⁽²⁹⁾ (as we fear we may) fall into the like distress.

6. We have said, 'Twere better the *Publick* should keep the *Beggars*, though they earned nothing, &c. 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 any thing. 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 *non-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 of *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 greatest part of it, and is thought to have more skill and experience to manage it; wherefore, to bring *England* into (30) *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 Clothiers 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 snapt that with the rest.

8. My next Observation is, That but few are *Murthered*, viz. not above 86 of the 229250, which have died of other Diseases and Casualties; whereas in *Paris* few nights scape 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 setling into a Trade for that employment. And the other is, The natural and customary abhorrence of that inhuman *Crime*, and all *Bloodshed*, by most *English men*: for of all that are *Executed*, few are for *Murther*. Besides the great and frequent *Revolutions* and *Changes* in *Government* since the Year 1650, have been with little *bloodshed*; the *Usurpers* themselves having *Executed* few in comparison, upon the *Accompt* of disturbing their *Innovations*.

10. In brief, when any dead Body is found in *England*, (31) no *Algebraist*, or *Uncypherer* 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 Murtherers, and that for ever, until it be done.

11. The *Lunaticks* are also but few, viz. 158 in 229250, though I fear many more than are set down in our *Bills*, few being entred for such, but those who die at *Bedlam*; and there all seem to dye 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 dye by reason of their *Madness*.

12. So that, this *Casualty* being so uncertain, I shall not force my self 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 a thousand, that he shall not dye a *Lunatick* in *Bedlam* within these seven years, because I find not above one in about one thousand five hundred have done so.

13. The like use may be made of the *Accompts* of men that made away themselves, || who are another sort of Mad (32) men, 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 dye in *Self-murther*, 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*, &c. 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 Pax*, gotten, for the most part, not so much by the intemperate use of *Venery* (which rather causeth the *Gout*) 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 (33) extravagancies: for in || the aforementioned 229250, 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 *Deaths heads* to put men in mind of their *Mortality*, but also as *Mercurial Statues* to point out the most dangerous waies 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 enquiry, I found that those who died of it out of the Hospitals (especially that of *Kingsland*, and the *Lock* in *Southwark*) were returned of *Ulcers* and *Sores*. And in brief, I found, that all mentioned to dye 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 (34) most miserable Houses of Un-||cleanness were: from whence I concluded, that only *hated* persons, and such, whose very *Noses* were eaten off, 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 dye 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, in stead of one given them¹, cannot tell whether this emaciation or leanness

¹ Cromwell's act of 24 August, 1653, provided for the election by each parish of a parish registrar, who might take "for every Birth of Childe, Four pence and no more; and for every Death, Four pence and no more: And for Publications, Marriages, Births or Burials of poor people who live upon Alms, nothing shall

were from a *Phthisis*, or from an *Hæctick Fever, Atrophy, &c.* or from an Infection of the *Spermatick* 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? (35)

21. To clear this Difficulty out of the Bills (for I dare venture on no deeper Arguments) I enquired what other Casualtie 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 *Livergrown* was the nearest. For in some years I find *Livergrown, Spleen, and Rickets*, put all together, by reason (as I conceive) of their likeness to each other. Hereupon I added the *Livergrowns* 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 it self, I compared with the *Livergrown* 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 were but 94 *Livergrowns*; and in the Year 1636 there were 99 *Livergrown*, 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.* 521) then there appeared not above 15 of *Livergrown*. ||

23. In the Year 1659 were 441 *Rickets*, and 8 *Livergrown*. (36)
In the Year 1658 were 476 *Rickets*, and 51 *Livergrown*. Now,

be taken," Scobell, II. 236. In most cases the old parish clerk was elected registrar (Christie, 140), and in London the parish clerks may have collected their fees through the searchers.

though it be granted that these Diseases were confounded in the Judgment of the *Nurses*, yet it is most certain, that the *Livergrown* did never but once, *viz. Anno 1630* exceed 100; whereas *Anno 1660*, *Livergrown* 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 *Anno 1649*, there were 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 back-startings 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 Colledge* one may sensibly discern¹. ||

(37) 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; *Anno 1655* it came to 145. In 57, to 277. In 60 to 314. Now these proportions far exceeding the difference of proportion generally arising from the increase of Inhabitants, and from the resort of *Advenæ* 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*, forasmuch 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 dye uncured, when there are more *Males* than *Females*, that is, an overplus of Husbands to all that can be Wives.

¹ "The author, going *ultra crepidam*, has attributed to the motion of the moon in her orbit all the tremors which she gets from a shaky telescope." De Morgan, *Budget of Paradoxes*, 68.

28. In the next place, I conjectured that this *stopping of the Stomach* might be the *Mother*, forasmuch as I have heard of many troubled with *Mother fits* (as they call them) || although few returned to have died of them; which con- (38) jecture, if it be true, we may then safely say, That the *Mother-fits* have also increased.

29. I was somewhat taken off from thinking this *stopping of the Stomach* to be the *Mother*, because I gessed rather the *Rising of the Lights* might be it. For I remembered that some Women, troubled with the *Mother-fits*, did complain of a *choaking 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 were but 44, and in 1660, 249, *viz.* almost six times as many. ||

31. Now forasmuch as *Rickets* appear much in the *Over-* (39) *growing* of *Childrens 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 to cause what I have imagined: but of this let the Learned *Physicians* consider, as I presume they have.

32. I had not medled 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 pump'd out of it at every stroke. ||

(40) 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 later, 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 *Gout* stands much at a stay, that is, it answers the general proportion of Burials; there dies not above one of 1000 of the *Gout*, although I believe that more dye *Gouty*. The reason is, because those that have the *Gout*, are said to be *long livers*; and therefore, when such dye, they are returned as *Aged*.

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

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

(41) [38]. *Agues* and *Fevers* are entred promiscuously, yet in the few Bills wherein they have been distinguished, it appears that not above 1 in 40 of the whole are *Agues*.

39. The *Abortives* and *Stilborn* are about the twentieth part of those that are *Christned*, 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 later years due Accompts have not been kept of the *Abortives*, as having been buried without notice, and perhaps not in *Church-yards*.

40. For that there hath been a neglect in the Accompts of the *Christnings*, is most certain, because until the Year 1642, we find the *Burials* but equal with the *Christnings*, or near thereabouts, but in 1648, when the differences in *Religion* had changed the Government, the *Christnings* were but two thirds of the *Burials*. And in the Year 1659, not half, *viz.* the *Burials* were 14720 (of the *Plague* but 36) and the *Christnings* were but 5670; which great disproportion could be from no other Cause than that abovementioned, forasmuch as the same grew as the Confusions and Changes grew. ||

41. Moreover, although the Bills give us in *Anno* 1659, ⁽⁴²⁾ but 5670 *Christnings*, 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 *Christnings* were 8288. Wherefore by the proportion of *Abortives*, *Anno* 1659, the *Christnings* should have been about 8500: but if we shall reckon by the Women dying in *Childbed*, of whom a better Accompt is kept than of *Stilborns* and *Abortives*, we shall find *Anno* 1659, there were 226 *Childbeds*; and *Anno* 1631, 112, *viz.* not $\frac{1}{2}$: Wherefore I conceive that the true number of the *Christnings*, *Anno* 1659, is above double to the 5690 set down in our Bills; that is, about 11500, and then the *Christnings* will come near the same proportion to the *Burials*, as hath been observed in former times.

42. In regular Times, when Accompts were well kept, we find that not above three in 200 died in *Childbed*, and that the number of *Abortives* was about treble to that of the Women dying in *Childbed*: from whence we may probably collect, that not one Woman of an hundred (I may say of two hundred) dies in her Labour; forasmuch as there be other Causes of a Womans dying with-||in the Month, than ⁽⁴³⁾ the hardness of her Labour.

43. If this be true in these Countries, where Women hinder the facility of their *Child-bearing* by affected straitening of their Bodies; then certainly in *America*, where the same is not practised, Nature is little more to be taxed as to Woman, than in *Brutes*, among whom not one in some thousands do

dye 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 *Christnings* 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 publick *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
(44) Children *baptized* || by such Scruplers, to carry their Children unto such other *Ministers*, as having performed the thing, had not the Authority or Command of the *Registry* to enter the Names of the *baptized*.

46. A third Reason was, That a little Fee was to be paid for the *Registry*¹.

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 *Registred*, 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 *Registring* 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 1000.

49. It is to be noted, That from 1629 to 1636, when the *Convulsions* were but few, the number of *Chrysome*s and *Infants* was greater: for in 1629, there were of *Chrysome*s and *Infants*
(45) 2596, and of the *Convulsion* 52, || *viz.* of both 2648. And in

¹ See p. 356 note.

1636 there were of *Infants* 1895, and of the *Convulsions* 709; in both 2604, 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 1629 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 1636, the number of *Worms* and *Teeth* wants by above 400 *per Annum* of what we find in following years. ||

CHAP. IV.

(46)

Of the Plague.

I. **B**Efore 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.

¹ There died <i>Anno</i> 1592. from <i>March</i> to <i>December</i> ,	25886
Whereof of the <i>Plague</i>	11503
<i>Anno</i> 1593,	17844
Whereof of the <i>Plague</i>	10662
<i>Christned</i> in the said year	4021
<i>Anno</i> 1603, within the same space of time, were	
Buried	37294
Whereof of the <i>Plague</i>	30561
<i>Anno</i> 1625, within the same space	51758
Whereof of the <i>Plague</i>	35417
<i>Anno</i> 1636, from <i>April</i> to <i>Decemb.</i>	23359
Whereof of the <i>Plague</i>	10460

¹ On the trustworthiness of the following figures see the notes to the "Table shewing how many died weekly," p. 426.

(47) 2. Now it is manifest of it self, 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 Years 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 2 to 5.

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 1000, the said 343 is not $\frac{1}{3}$ of 1000.

4. In *Anno* 1603, the proportion of the *Plague* to the whole was as 30 to 37, *viz.* as 4 to 5, which is yet greater than the last of 7 to 20²: 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 four was the greatest Mortality at large, we reason thus : ||

(48) <i>Anno</i> 1592	{ Buried Christned	26490 4277	} or { as {	6 1
<i>Anno</i> 1603	{ There died in the whole year of all Christned	38244 4784	} or { as {	8 1
1 to 8, or $1\frac{1}{4}$ to 10	{ <i>Anno</i> 1625 { Died in the whole year Christned	54265 6983	} or { as {	8 1
<i>Anno</i> 1636	{ There died, <i>ut supra</i> , Christned	23359 9522	} or { as {	5 2

7. From whence it appears, That *Anno* 1636, the Christnings were about $\frac{2}{3}$ parts of the Burials : *Anno* 1592 but $\frac{1}{3}$; 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

¹ 1st. ed., ' $\frac{2}{3}$,' German transl., ' nicht $\frac{1}{3}$.'

² 20 is a misprint for 10.

now we say, that the same was not a greater year of *Mortality* than *Anno* 1625. Now to reconcile these two Positions, we must alledge, that *Anno* 1625, there was an error in the Accompts or Distinctions of the *Casualties*; that is, more died of the *Plague* than were re-||counted for under that (49) name. Which Allegation we also prove thus, *viz.*

8. In the said year 1625 there are said to have died of the *Plague* 35417, and of all other Diseases 18848; whereas in the years, both before and after the same, the ordinary number of Burials was between 7 and 8000; so that if we add about 11000 (which is the difference between 7 and 18) to our 35, the whole will be 46000, which bears to the whole 54000, as about 4 to 5, thereby rendring 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 equal¹.

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 *Anno* 1636 there died 10400 of the *Plague*, the $\frac{1}{4}$ whereof is 2600. Now there are said to have died of all other Diseases that Year 12959, out of which number deducting 2600, there remain 10359, 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 (50) died above 4000, in others above 2000, and in but one fewer 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 later but 134 of the *Plague*. Moreover, in the said Year 1625, the *Plague*

¹ The report of a case of the plague in any family led to the "shutting up" of the house infected, and thus increased the danger of the other members of the household. This danger was probably avoided, in many cases, by bribing the searchers. Creighton, I. 312, 318, 663, 672, also in *Social England*, IV. 469. The probable concealment of the plague was noted at the time. *Salvetti's Correspondence*, 11 July, 1625, *Hist. MSS. Com.* XI. pt. I. p. 26—27; Rev. Joseph Mead to Sir Martin Stuteville, Birch, *Court and Times of Charles I.*, vol. I. p. 39.

decreased from its utmost number 4461 a week, to below 1000 within six weeks.

11. The *Plague* of 1636 lasted twelve Years, in eight whereof there died 2000 *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 suddain 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 Mens 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*, &c. do fore-run (51) the *Plague* a || Year, two or three; for in 1622 there died but 8000: in 1623, 11000: in 1624, about 12000: till in 1625 there died of all Diseases above 54000.

C H A P. V.

Other Observations upon the Plague, and Casualties.

1. **T**HE *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 (52) *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 20 *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 21 of *July* to the 12 of *October*, the *Plague* increasing reduced the *Christenings* to 70 at a *Medium*, diminishing the above proportion down to $\frac{2}{3}$. Now the cause of this must be flying, and death, as well as Miscarriages and Abortions; for there died within that time about 25000, 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 five a *Week* of the *Plague*, one with another. In this time, the *Christenings* were one with another 180. The which decreased gradually by the 22 of *September* to 75, or from the proportion of 12 to 5, which evidently squares with our former. Observation. (53)

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 8408, which in 1624, next preceding the *Plague-year* 1625 (that had swept away above 54000) were but 8299; and the *Christenings* of 1626 (which were but 6701) mounted in one year to the said 8408.

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 fortifie this Assertion by shewing, that before the *Plague-year* 1603, the *Christenings* were about 6000, which were in that very year reduced to 4789, but crept up the next year 1604 to 5458, recovering their former

ordinary proportion in 1605 of 6504, 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 ; (54) which Ob-||servation 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*.

CHAP. VI.

Of the Sickliness, Healthfulness, and Fruitfulness of Seasons.

1. **H**AVING 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 afore going 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 two hundred 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 (55) *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 Tables¹.

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

¹ According to the table on p. 408 the years 1623, 1624, 1633 and 1634 fail to satisfy Graunt's definition of sickly years.

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 afore-going.

4. As to this year 1660, although we would not be thought *Superstitious*, yet it is not to be neglected, that in the said year was the *King's Restauration* to His Empire over these three Nations, as if God Almighty had || caused (56) 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 *King's Reigns*¹, because it hapned so twice, *viz. Anno 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*. ||

C H A P. VII.

(57)

Of the difference between Burials and Christenings.

I. 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,

¹ The outbreak of the Plague at times of coronation was perhaps in part due to the concourse of people to London.

in 40 years, from the year 1603, to the year 1644, *exclusive* of both years, there have been set down (as hapning within the same ground, space, or Parishes¹) although differently numbred and divided, 363935 *Burials*, and but 330747 *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 (58) into small Tenements. It is there-||fore certain, that *London* is supplied with People from out of the Country, whereby not only to supply the overplus differences 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 *Cornwal*, 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 *Burroughs* send two *Burgesses*, whereas *London* it self sends but four, although it bears the fifteenth part of the charge of the whole Nation in all *Publick Taxes* and Levies².

4. But, if we consider what I have upon exact enquiry found true, *viz.* That in the Country³, within ninety years, there have been 6339 *Christenings*, and but 5280 *Burials*, the increase of *London* will be salved without inferring the decrease of the People in the Country; and withal, in case all *England* (59) 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 it self; for if there be in the 97, 16, 10, and 7 Parishes, usually comprehended within our

¹ See Introduction.

² See *Verbum Sap.*, p. 107, note 3.

³ See table, p. 415.

Bills, but 460000 Souls, as hereafter we shall shew¹, then there are in all *England* and *Wales* 6440000 Persons, out of which subtract 460000, for those in and about *London*, there remain 5980000 in the Country, the which increasing about $\frac{1}{4}$ part in 40 years, as we shall hereafter prove² doth happen in the Country, the whole increase of the Country will be about 854000 in the said time; out of which number, if but about 250000 be sent up to *London* in the said 40 years, viz. about 6000 *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 250000 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* 9750 *per Annum*. And between 1635 and 1644 were 18000, the difference whereof is 8250, 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 30 times as many (according to the (60) proportion of 3 dying out of 11 Families)³ viz. 6180 *Advenæ*, the which number multiplied again by the 40 years, makes the Product 247200, which is less than the 250000 above-propounded; so as there remain above 600000 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 are in *England* and *Wales* about 39000 square Miles of Land, and we have computed that in one of the greatest Parishes in *Hants*hire, 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 over-plus 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

¹ See p. 331, note.

² Cf. p. 389.

³ See p. 385.

of square Miles, produces 640000¹ Souls in all *London* included.

3. There are about 10000 Parishes in *England* and *Wales*, the which, although they should not contain the $\frac{1}{3}$ part of (61) the Land, nor the $\frac{1}{4}$ of the People of that Country-Pa-||rish, 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.

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 re-furnishing *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 (62) Country; we say, that, if there be sixty of them || Breeders in *London*, there are more than sixty 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 proportionably

¹ In fact 6,435,000.

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 Country-men 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 Sea-men of *London* leave their Wives (63) 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 *Smoaks*, *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 Countries than in *London*, *per 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 ten Men, is so far from || having ten times as many Children, that she hath none at all. (64)

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 Breeding, whereas *Anxieties* of the mind hinder it.

C H A P. VIII.

Of the difference between the numbers of Males and Females.

THE next Observation is, That there be more *Males* than *Females*¹.

1. There have been Buried from the year 1628, to the year 1662, *exclusive*, 209436 *Males*, and but 190474 *Females*: but it will be objected, That in *London* it may be indeed 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 139782 *Males*, and (65) but 130866 *Females*, and that || the Country-Accounts are consonant enough to those of *London* upon this matter².

2. What the Causes hereof are, we shall not trouble our selves 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 *Mahumetism*, 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.

¹ The Table of Males and Females is at p. 411.

² See p. 389.

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 *Weathers*, there are fewer. From whence it will follow, That when by experience it is found how many *Ews* (suppose twenty) (66) 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 *Forein* parts, than Women; and lastly, more remain unmarried than of Women, as *Fellows* of *Colleges*, and *Apprentices* above eighteen, || &c. yet the said thirteenth (67) 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 *Prolifick* fourty 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 (68) by reason of their *Vices*, as 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, insomuch 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; forasmuch, 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 and 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 flying 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 (69) them, the evacuating of a fourth or third 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 thence hither, 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 later being useless as to multiplication, without the former, as was said before in 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 *Cœlibate*, than the natural over-plus, or difference between them and *Females* amounts unto; then multiplication is hindred: 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 (70) 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 Murthers; 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)¹ it is no wonder why States, by encouraging Marriage,

¹ This idea, which occurs in slightly different phraseology in Petty's *Treatise of Taxes* (p. 68), has been pronounced a "leading thought in his writings."

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 over-plus (71) 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 splendour; which power he having, he 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. ||

(72)

C H A P. IX.

Of the growth of the City.

I. I N the year 1593 there died in the ninety seven Parishes within the walls, and the sixteen without the walls (besides 421 of the *Plague*) 3508. And the next year 3478, besides 29 of the *Plague*: in both years 6986. Twenty years

Ingram, *Hist. of Political Economy*, 51; the suggestion is followed by Bevan, *Sir W. Petty, a Study*, 53. The figure in which the idea is expressed apparently reflects the current notion, at least as old as Aristotle, that the female is passive in generation. Legouvé, *Moral history of Woman*, tr. Palmer, 216. Even the form of expressing the analogy is, probably, older than either Graunt or Petty, for both place the words in brackets—a seventeenth century equivalent for marks of quotation—and Schulz, in his translation of Graunt, writes, “weil, nach dem Sprichwort, die hander der welt vater, und das land derselbten mutter ist.”

after there died in the same ninety seven, and sixteen Parishes, 12110, *viz.* Anno 1614, 5873; and Anno 1615, 6237: 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.* Anno 1634 and 1635, were 15625, *viz.* as about twenty four to thirty one: the which last of the three numbers, 15625, is much more than double to the first 6986; *viz.* the said Parishes have in forty years increased from twenty three to fifty two.

3. Where is to be noted, That although we were necessitated to compound the said || ninety seven with the sixteen (73) Parishes, yet the sixteen Parishes have increased faster than the ninety seven. For, in the year 1620, there died within the walls 2726, and in 1660 there died but 3098 (both years being clear of the *Plague*:) so as in this forty years the said ninety seven Parishes have increased but from nine to ten, or thereabouts, because the Housing of the said ninety seven 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 ninety seven Parishes 1518, and of the *Plague* 280. And in the year 1660, 3098, and none of the *Plague*; so as in fifty six years the said Parishes have doubled. Where note, That forasmuch as in 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 2014, which died Anno 1605, and 3431 Anno 1659 choosing rather from hence to assert, That the said ninety seven and sixteen Parishes increased from twenty to thirty four, or from ten to seventeen in fifty four years, than from one to two in fifty six, as in the last foregoing *Paragraph* is set down. ||

5. Anno 1605 there died in the sixteen Out-Parishes (74) 2974, and Anno 1659, 6988: so as in the fifty four years the said Parishes have increased from three to seven.

6. Anno 1605 there died in the eight Out-Parishes 960, Anno 1659 there died in the same scope of Ground, although

called now ten Parishes (the *Savoy* and *Covent-Garden*¹ being added) 4301: so as the said Parishes have increased, within the said fifty four years, more than from one to four.

7. Moreover, there were Buried in all, *Anno* 1605, 5948, and *Anno* 1659, 14720, *viz.* about two to five.

8. Having set down the proportions, wherein we find the said three great Divisions of the whole Pyle, 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 ninety seven Parishes within the Walls the increase is not discernible, but where great Houses, formerly belonging to Noblemen, before they built others near *White-hall*, have been turned into Tenements; upon which Account *Alhallows upon the Wall* is increased by the conversion of the Marquess of *Winchester's* House, lately the *Spanish* Embassadour's, into a new Street; the like of (75) Alder-||man *Freeman's*, and *La Motté's* near the *Exchange*; the like of the Earl of *Arundel's* in *Loth-bury*; 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 *Duke's-Place*, and others heretofore.

9. Of the sixteen Parishes, next without the Walls, *Saint Giles Cripplegate* hath been most enlarged, next to that *Saint Olaves 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's* and *Saint Martin's in the Fields* are most increased, notwithstanding *Saint Paul's Covent-Garden* was taken out of them both.

11. The general Observation, which arises from hence, is, That the City of *London* gradually removes *Westward*, and did not the *Royal Exchange* and *London-Bridg* stay the Trade, it would remove much faster: for *Leaden-Hall-street*, *Bishop's-Gate*, and part of *Fen-Church-street*, have lost their Ancient Trade; *Grace-Church-street* indeed keeping it self yet entire,

¹ St Mary, Savoy, was erected a parish in 1606, St Paul, Covent Garden, in 1645. See Introduction, also p. 345, note.

by reason of its conjunction with, and relation to *London-Bridg.* ||

12. Again, *Canning-street* and *Watlin-street*, have lost (76) their Trade of *Woollen-Drapery* to *Paul's Church-Yard*, *Ludgate hill*, and *Fleet-street*: the *Mercery* is gone from out of *Lumbard-street* and *Cheap-side* 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*, &c.

14. Thirdly, where the *Consumption* of a Commodity is, *viz.* among the Gentry, the Venders 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 inconveniencies.

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* (77) 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 embarasses of Coaches near both these Gates, especially *Lud-gate*.

C H A P. X.

Of the Inequality of Parishes.

1. **B**Efore 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* 1191, that but twelve died in *Trinity-Minories*, *Saint 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 the *Minories*, and 200 times as big as *Saint John the Evangelist's*, *Mary-Coal-Church*, *Bennet's* (78) *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 *Pastours* 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 difference 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 equal¹, 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

¹ On the inconvenience arising, after the Restoration, from the excessive size of certain parishes, see Eden, *State of the Poor*, I. 175—177 n. and cf. 14 Charles II. c. 12, 21. See also Petty's *Treatise of Taxes*, p. 5, note, and his *Polit. Arith.* p. 301.

at all for our *Preaching Auditories*, but rather the Figure of an *Amphi-Theater* with Galleries, gradually over-look-||ing each (79) 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 *Coalman-street, Alhallows-Barking, Christ-Church, Black-Friers, &c.* in each whereof die between 100 and 150 *per Annum*, then an 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 *Over-seers* 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. ||

C H A P. XI.

(80)

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*¹: 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 *Anno* 1625 before the great *Plague*. I must confess, that, until this provocation, I had been frighted, with that mis-understood

¹ *The Scots Scouts Discoveries* declared that in 1639 London contained 100000 Frenchmen and Dutchmen. Morgan, *Phoenix Britannicus*, 463. Howell estimated that in 1657 the various parts of London "with divers more which are contiguous and one entire piece with London herself" had a population of a million and a half. *Londonopolis*, 403.

Example of *David*¹, 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 it self in this manner: *viz.*

2. First, I imagined, That, if the Conjecture of the worthy Person afore-mentioned had any truth in it, there must needs (81) be about six or seven Millions of People in *London* || now; but, repairing to my Bills, I found, that not above 15000 *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 longer², I supposed it was the same, that one of any ten might die within one year. But when I considered, that of the 15000 afore-mentioned about 5000 were *Abortive* and *Still-born*, 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 10000 *per Annum* in *London*, which number being multiplied by 10², there must be but 10000³ in all, that is not the $\frac{1}{80}$ 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 about 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 (82) less than || the *Burials*. The *Burials* in these late years at a *Medium* are about 13000, and consequently the *Christenings* not above 12000. I therefore esteemed the number of *Teeming-Women* to be 24000: then I imagined, that there might be twice as many Families, as of such Women; for that there

¹ 2 Samuel, xxiv. 1—9; 1 Chronicles, xxi. 1—8.

² If it be "an even lay, whether any man lives ten years longer," Graunt's multiplier, seven lines lower, should be 20, not 10.

³ 10000 is a misprint for 100000.

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 48000 makes 384000.

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, 13000 having died in the whole, it should follow, there were 48000¹ Families according to the last-mentioned Account.

6. Thirdly, the Account, which I made of the *Trained-Bands* and *Auxiliary-Souldiers* doth enough justifie this Account.

7. And lastly, I took the Map of *London* set out in the year 1658 by *Richard Newcourt*², drawn by a Scale of Yards. Now I gessed that in 100 Yards square there might be about 54 Families, supposing every House || to be 20 Foot in the (83) 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 11880 Families within the Walls. But forasmuch as there die within the Walls about 3200 *per Annum*, and in the whole 13000; it follows, that the Housing within the Walls is $\frac{1}{4}$ part of the whole, and consequently, that there are 47520 Families in and about *London*, which agrees well enough with all my former computations: the worst whereof doth sufficiently demonstrate, that there are two Millions³ of People in *London*, which nevertheless most men do believe, as they do, that there be three Women for one Man, whereas there

¹ More accurately 47,667.

² "An exact Delineation of the Cities of London and Westminster and the Suburbs Thereof, Together wth y^e Burrough of Southwark And All y^e Through-fares Highwayes Streetes Lanes and Common Allies wthin y^e same Composed by a Scale and Ichnographically described by Richard Newcourt of Somerton in the Countie of Somersett Gentleman. Will^m Faithorne sculpsit."——Facsimile, London: E. Stanford, 1878.

³ The first edition has, "that there are no Millions," the fourth, "that there are not two Millions."

are fourteen Men for thirteen Women, as elsewhere hath been said¹.

8. We have (though perhaps too much at Random) determined the number of the Inhabitants of *London*² to be about 384000: the which being granted, we assert, that 199112 are *Males*, and 184186 *Females*.

9. Whereas we have found³, that of 100 quick Conceptions about 36 of them die before they be six years old, and (84) that perhaps but one surviveth 76⁴; we having seven *De-cads* between six and 76, we sought six mean proportional numbers⁵ 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 an hundred there die within the first six years⁶ 36

¹ See p. 374.

² Excluding Westminster and the six parishes enumerated at p. 345.

³ See p. 349.

⁴ From the bills Graunt calculates (p. 352) that seven in 100 survive 70. The grounds of his assumption that but one survives 76 are not evident.

⁵ This method of constructing a table of mortality suggests Petty's *Discourse of Duplicate Proportion*.

⁶ With this calculation of London's mortality may be compared the figures for Geneva in the seventeenth century. The following table, compiled from Édouard Mallet's *Recherches hist. et stat. sur la population de Genève (Annales d'hygiène publique et de médecine légale, XVII. p. 30, Janv., 1837)*, gives the returns for all the persons whose age at death was recorded in the years 1601—1700. The table reveals a juvenile mortality even higher than Graunt's calculation for London.

Age in years.	Number of deaths.	Percentage.
1—6	22,967	42.6
7—16	4,949	9.3
17—26	4,052	7.6
27—36	3,761	7.1
37—46	3,938	7.4
47—56	4,026	7.6
57—66	3,800	7.2
67—76	3,273	6.4
77—86	2,436	4.7
87—120	581	0.1
	53,783	100

The next ten years, or <i>Decad</i>	24
The second <i>Decad</i>	15
The third <i>Decad</i>	9
The fourth	6
The next	4
The next	3
The next	2
The next	1

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

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

11. It follows also, That of all which have been conceived, (85) there are now alive 40 *per Cent.* above sixteen years old, 25 above twenty six years old, & *sic deinceps*, 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 deinceps*.

Wherefore, supposing there be 199112 *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 67694, *viz.* near 70000; the truth whereof I leave to examination, only the $\frac{1}{4}$ of 67694, *viz.* 13539, is to be added for *Westminster, Stepney, Lambeth*, and the other distant Parishes; making in all 81233 fighting Men.

12. The next enquiry will be, In how long time the City of *London* shall, by the ordinary proportion of Breeding and dying, double its breeding People?¹ I answer, In about seven

¹ Apparently Graunt has not expressed himself with entire accuracy. The question which he put is, in how many years will 24000 pairs become 48000 pairs? The question which he probably meant to put is, in how many years will 24000 pairs beget 48000 children? He answers, in seven years, or, plagues

years, and (*Plagues* considered) eight. Wherefore, since there be 24000 pair of Breeders, that is $\frac{1}{3}$ of the whole, it follows, that in eight times eight years the whole People of the City shall double, without the access of Forreiners: the which (86) 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 5610 years¹, 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 older², as some vainly imagine, nor above what the *Scripture* makes it.

CHAP. 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 *Hants*³, being a place neither famous for *Longevity* and *Healthfulness*, nor for the contrary. Upon which Tables we observe, ||

(87) 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

considered, in eight. If, then, eight years are necessary for the birth of 48000 persons, the birth of 384000—a number sufficient, together with those already living, to double the population of the City—will require sixty-four years. It is unnecessary to dwell on the defects of this calculation. On one hand it ignores the increase in the number of pairs during sixty-four years. On the other hand, it tacitly assumes that the 384000 now living, and likewise all those new-born within the sixty-four years, will live to the end of that period.

¹ According to the chronology of Scaliger (*De emendatione temporum*, pp. 431—432) which places the Creation in the year 3948 B.C.

² Previous editions, 'old.'

³ Romsey in Hampshire, see p. 412, note 1.

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 *Decads* they differed not $\frac{1}{100}$ part; That in one of the two *Decads*, 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 *Decads*, 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 (88) than buried in the said Parish (the which, both 90 years ago, and also now, consisted of about 2700 Souls) but 1059, *viz.* not 12 *per Annum*, one year with another.

6. That these 1059 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 Reasons¹) then *London* increases by such *Advenæ* every year above 6000: 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

¹ See p. 370.



known, That about 400 went to *New-England*, the *Caribe-Islands*, and *New-found-Land*, within these last forty years. ||

(89) 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 *Decads* 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 Observation¹, 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. Anno* 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 *Anno* 1658. Again *Anno* 1568, when 93 were born, but 42 died. *Anno* 1584, when 90 were born, but 41 died. *Anno* 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, *Anno* 1638, when 156 died *per Annum*, (90) which was the greatest year || of *Mortality*, then less than the meer Standard 70, *viz.* but 66, were born. Again *Anno* 1644, when 137 died, but 59 were born. *Anno* 1597, when 117 died, but 48 were born. And *Anno* 1583, when 87 died, but 59 were born.

A little Irregularity may be found herein, as that *Anno* 1612, when 116 died (*viz.* a number double to our Standard 58, yet) 87 (*viz.* 17 above 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 it self.

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 good satisfaction that it was not,

¹ See pp. 368—9.

(which I 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 2700 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*, &c. among them. It follows, that (91) 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 *Decad* of years hath been double, whereas in the Country it hath been *quintuple*, not only within the whole ninety years, but also within the same *Decad*: for *Anno* 1633 there died but 29, and *Anno* 1638 the above-mentioned number of 156. Moreover, as in *London*, in no *Decad*, 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 appears¹.

<i>Decad</i>	greatest	least
	<i>number of Burials</i>	
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

¹ The figures of these summaries are the same in all editions of the *Observations*, but the tables themselves give, in many instances, figures differing from the summaries. Thus, according to the tables, the greatest number of burials in decade four, the least number of burials in decades six and seven, and the least number of births in decades three and eight are erroneous. The discrepancies, however, are not large enough to invalidate the observation which Graunt makes upon the summaries.

- (92) Which shews, that the opener and freer *Airs* are most subject both to the good and bad Impressions, and that the *Fumes*, *Steams* and *Stenches* 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 justled 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 sometime *quintuple* to one another, but of the Christenings we affirm, that within the same *Decad* they are seldom double, as appears by this Table, *viz.*¹.

<i>Decad</i>	greatest number of Births	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

- (93) 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 $\frac{1}{2}$, or increased double, as they did *Anno* 1584, when 90 were born, and *Anno* 1586, wherein were but 45: or to rise from 52, as *Anno* 1593, to 71, as in the next year 1594. Now these disproportions both in Births and Burials confirm what hath been before asserted¹, 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

¹ See pp. 368—9, 390.

multiplying 58 by 4¹, which made the *Product* 232, the number of Families. Hereupon I wondred, 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 1856, thereby hoping to have had the number of the Inhabitants, as I had for *London*²: but when upon enquiry, I found there had been 2100 Communicants in that Parish, in the time of a *Minister* who forced too many into that Ordinance, and || that 1500 was the (94) ordinary number of Communicants in all times; I found also, that forasmuch as there were near as many under 16 years old, as there are above³, *viz.* Communicants, I concluded, that there must be about 2700 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 dies⁴, over and above what dies of the *Plague*.

12. It follows therefore from hence, what I more faintly asserted in the former Chapter⁵, 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 Stenches above-mentioned, although they make the Air of *London* more equal, yet not more *Healthful*.

13. When I consider, That in the Country seventy are Born for fifty eight 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

¹ Apparently on the assumption that in the country one dies out of four families each year. Graunt has calculated (p. 385) that in the city there die three out of eleven families.

² See p. 385.

³ Sir Peter Pett also adopts this "currant rule of calculation" in his *Happy future State of England*, p. 118. Cf. *Another Essay*, note on "The Telling of Noses."

⁴ This does not exactly agree with Graunt's estimate (p. 385) that 3 die in 11 families of 88 persons.

⁵ Chap. VII.

more *unhealthful*: and inclined to believe, that *London* now (95) is more *unhealthful* than heretofore; partly for that || it is more populous, but chiefly because I have heard, that sixty years ago few *Sea-Coals* were burnt in *London*, which are now universally used. For I have heard, that *Newcastle* is more *unhealthful* than other places, and that many People cannot at all endure the smoak of *London*, not only for its unpleasantness, but for the suffocations which it causes¹.

14. Suppose, that *Anno* 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 it self by generation in much above 200²: 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. ||

(96)

The Conclusion.

IT may be now asked, To what purpose tends all this laborious bustling 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 *Decad* of years in *age*?
6. How many *Fighting* Men?
7. How much *London* is, and by what steps it hath, increased?

¹ Evelyn's *Fumifugium*, with its plan for banishing "that hellish and dismal Cloud of Sea-Coale," was published in the previous year, 1661. See Petty's *Treatise of Taxes*, p. 41, note.

² This agrees but ill with Graunt's calculation that "in eight times eight years the whole People of the City shall double, without the access of Forreiners," p. 388.

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? (97)
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 (98) whereas the Art of Governing, and the true *Politicks*, 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 intrinsick

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 Cattel 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 intrinsick value: for there is also another value meerly accidental, or extrinsick, (99) 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 intrinsick 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, &c. 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 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 gessed at) it would appear, how small a (100) 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 meer Voluptuaries, and as it were meer Gamesters by Trade; how many live by puzling poor people with unintelligible Notions in Divinity and Philosophy; how many by perswading credulous, delicate, and ligitious Persons, that their Bodies or Estates

are out of Tune, and in danger; how many by fighting as Souldiers; how many by Ministries of Vice and Sin; how many by Trades of meer Pleasure, or Ornaments; and how many in a way of lazy attendance, &c. 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 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, certain, and easie 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. ||



(101)

A N

APPENDIX¹.

FORasmuch as a long and serious perusal of all the Bills of Mortality, which this great City hath afforded for almost fourscore years, hath advanced but the few Observations comprised in the fore-going Treatise; I hope very little will be expected from the few scattered Papers that have come to my hands since the publishing thereof, especially from one that hath learned from the *Royal Society*, how many Observations go to the making up of one *Theoreme*, which (like Oaks and other Trees fit for durable Building) must be of many years growth.

The Accounts which follow, I reckon but as Timber and Stones; and the best Inferences I can make, are but as hewing them to a Square: as for composing a beautiful and ||
(102) firm Structure out of them, I leave it to the Architecture of the said *Society*, under whom I think it honour enough to work as a Labourer.

My first Observation shall be, That at *Dublin*² the Number

¹ The Appendix first appears in the third edition, (1665).

² See p. 421. On the history of the Dublin bills, see Petty's *Observations*. It is not improbable that Graunt secured this Dublin bill from Petty. While Petty was in Ireland he corresponded with Graunt, and 4 February, 1662—3, he wrote to Lord Brouncker from Dublin, "when I first landed here some matter presented it selfe whereuppon to make observations uppon Ireland, not unlike those which Mr Graunt made uppon the London Bills of Mortality. I have done so much uppon it, as hath cost me some pounds, but not so much as is worth more than a bare mention." *Royal Society's Letter Book*, P 1, f. 14.

of Weekly Burials being about 20, and those of *London* about 300, as also the Number of People reckoned to be within the Limits of the Bills of Mortality at *London* to be 460000; it will follow, that the Number of Inhabitants of *Dublin* be about 30000, *viz.* about one fifteenth part of those in and about *London*, which agrees with that Number which I have heard the Books of Poll-Money, raised but little before the time of this Bill, have exhibited as the Number of Inhabitants of that City: So as although I do not think one single Weekly Bill is sufficient to ground such a Conclusion upon, yet I think that several yearly Bills are the best of the easie ways from which to collect the Number of the People.

Secondly, Although I take it for granted, that in *Dublin* there be more Born than Buried, because the same hath appeared to be so in *London* by the Bills of Mortality before the year 1641, when the Civil Wars began, and much more eminently in *Amsterdam*, as shall be hereafter shewn; yet there are but 14 set down as Christned; which shews, that || the defect there is much the same as at *London*, whether the (103) cause thereof be negligence in the Register, on non-conformity to Publick Order, or both, I leave to the curious. I believe the cause is also the same, forasmuch as I heard it to be a Maxim at *Dublin*, to follow, if not forerun, all that is, or as they understand will be, practised in *London*; and that in all particulars incident to humane affairs.

I have here inserted two other Country-Bills, the one of *Cranbrook*¹ in *Kent*, the other of *Tiverton*² in *Devonshire*, which with that of *Hantsire*³, lying about the midway between them, give us a view of the most Easterly, Southerly, and Westerly parts of *England*: I have endeavoured to procure the like account from *Northumberland*, *Cheshire*, *Norfolk*, and *Nottinghamshire*; Thereby to have a view of seven Counties most differently situated, from whence I am sorry to observe that my Southern friends have been hitherto more curious and diligent than those of the North. The full observation from these Bills is, that all these three Country

¹ See pp. 419—421.

² See pp. 416—418.

³ See pp. 412—415.

Bills agree, that each Wedding produces four Children, which is likewise confirmed from the Bills of *Amsterdam*. Secondly, they all agree that there be more Males born than Females, || (104) but in different proportions, for at *Cranbrook* there be 20 Males for 19 Females, in *Hantshire*, 16 for 15, in *London* 14 for 13, and at *Tiverton*, 12 for 11. Thirdly, I have inserted the Bills themselves, to the end that whoever pleases may examin, by all three together, the Observations I raised from the *Hantshire* Bill alone; conceiving it will be more pleasure and satisfaction to do it themselves, than to receive it from another hand. Only I shall add, as a new Observation from them all, that in the years 1648 and 1649, being the time when the people of *England* did most resent the horrid Parricide of his late Sacred Majesty, that there were but nine weddings in that year in the same places, when there were ordinarily between 30 and 40 *per Annum*; and but 16, when there were ordinarily at other times between 50 and 60. And it may be also observed that something of this black murder appeared in the years 1643 and 1644, when the Civil war was at the highest, but the contrary in the years 1654, 1655, &c. to prevent the new way of Marriage then imposed upon the people¹.

I have also supplied the Tables from the three general Bills for the years 1662, 1663, and 1664, which you will find (105) to justify || the former Observations. But most eminently that which I take to be of most concernment, namely, of the difference between the numbers of Males and Females.

In the former Observations I did endeavour to deduce the number of the Inhabitants about the City of *London*, from the Bills of Mortality, concluding them to be about 460000², and did likewise set forth by what steps the people of the said City have increased from two to five since the year 1600³.

¹ Cromwell's act requiring civil marriage was passed 24 August, 1653, and went into legal effect September 29 of the same year. If, therefore, a desire to "prevent the new way of Marriage" caused an increased number of weddings in 1654, 1655, &c., the actual enforcement of the act must have been somewhat lax.

² In the Index, p. 331, note.

³ See pp. 378—380.

And particularly in what proportions the City increased in its several parts from time to time: I have now procured an Account of the Men, Women, and Children, which were Anno 1631¹. found within the Liberties of *London*, which are circumscribed by *Temple-Bar*, *Holborn-Bars*, *Smithfield-Bars*, *Shoreditch-Bars*, *White-chappel-Bars*, and to the *Tower* Liberties, and Meal-market in *Southwark*; by which Account I hope it will appear, that I computed too many rather than too few, although the most part of men have thought otherwise. Nor do I wonder at it, since I never observed more enormous mistakes in any matter than concerning the number of people, Ale-houses, Coaches, Ships, Sea-men, Water-men, and several || other Tradesmen, &c. The proportions of all (106) which I have always thought is necessary to be known, in order to an exact Symmetry of the several members of a Common-wealth. I say, that the whole number of Inhabitants exceeds not 460000.

1. The number of Men, Women, and Children, found in the City and Liberties 1631, was 130178.

2. The Liberties of the City of *London* consist of the 97 Parishes within the Walls, and of $\frac{3}{4}$ of the 16 Parishes next without them, which estimate of mine, nevertheless, I leave to examination.

The Liberties of *London* from the year 1631 to the year 1661 increased from 8 to 11, as may appear by the Tables, and consequently the said 130000 found in the year 1631, were increased to 179000, in *Anno* 1661.

Lastly, the Liberties of *London* in the year 1661 were in proportion to the whole, as 4 to 9, and consequently if there were 179000 souls, in the said Liberties, there was not above 403000 in the whole number of Parishes then comprehended in the Bills of Mortality.

The substance of the *Amsterdam* Bills of Mortality is, *viz.*

1. That there died in the several years of the Plague, as followeth: ||

¹ See p. 405.

(107) Anno	1622	4141
	1623	5929
	1624	11795
	1625	6781
	1626	4425
	1627	3976
	1628	4497
	1636	17193
	1655	16727
	1663	9752
	1664	24148

2. That there are eleven burying-places, besides the Hospital and Pest-house, 257 Streets and Lanes, with 43 Burgwalls and Grachts in that City.

3. That in seven years, beginning from the 15 of *August* 1617 to the same day 1624, there were Christned in the reformed Churches of *Amsterdam* 52537, and that there died in the same time 32532. So as there were 20005 more born than buried, besides those that were Christned in other Congregations. And in the same time were 16430 publisht Marriages.

4. That in the first week of *September* 1664 there died 1041, and in eighteen weeks before the Burials increased (108) from 331 up to the said number of 1041, || and in twelve weeks after decreased back to the like number of 330.

5. In *February* following there died but 118 a week, and the ordinary number of weekly Burials is about 100, so as *London* seems to be three times as big as *Amsterdam*.

6. I have likewise hapned on some other Accompts, relating to Mortalities of some great Cities of the World, of what Authority I know not, but as printed at *Amsterdam* 1664, viz. Anno 1619 there died in *Grand Cairo* in ten weeks 73500, without any visible diminution of the people.

7. Anno 1625 there died in *Leyden* 9597. Anno 1635 there died in the same City of *Leyden* from the 14 of *July*, to the 29 of *December* 14381, the greatest week of mortality being the latter end of *October* was 1452. This Plague in 15

weeks increased from 96, to the said number of 1452, and in ten weeks after decreased to 107. Answerable to the time of Increase and Decrease afore-mentioned in *Amsterdam*, Anno 1655, there died in 21 weeks from *July* to *November* 13287, the greatest week being *Septemb.* 25. when died 896.

8. At *Harlem* there died in the same year, in the months of *August*, *September*, *October* and *November* 5723. ||

9. Anno 1637, in *Constantinople* there died 1500 *per diem*, (109) but how long this Plague lasted, appeareth not.

10. The same year died in *Prague* 20000 Christians, and 10000 Jews.

11. Anno 1652 there died in *Cracovia* 17000 Christians, and 20000 Jews.

12. Anno 1653 there died in *Dantzick* in the last week of *September* 640, and in *Conningsburg* 490.

13. 1654 there died in *Copenhagen* for several weeks 700 *per week*.

14. Anno 1655 there died at *Amsterdam* and *Leyden*, as above-mentioned; and at *Deventer* 70, 80, and 90 *per diem*.

15. At *Leeuwardeen* 56 *per diem*.

16. Anno 1656 there was so sweeping a Plague at *Naples*, that there died of it at the latter end of *May* 1300, or 1400 *per diem*. The sixth of *June* there were 80000 sick, that the well were not able to help, or bury the dead; presently after there died 5000 in three days; in *August* it began to cease, after it had destroyed 300000 people.

17. The Town of *Scala* in *Italy* was quite dispeopled, and at *Minory* there scaped but 22. At *Rome* there died in the same year about 100 *per diem* for a great while together. ||

18. 1657 There died at *Genoa* in Midsummer week 1200, (110) afterwards there died 1600 *per diem*; insomuch that in the beginning of *August* they burnt the dead Corps for want of hands to bury them, which great Mortality decreased to five or six *per diem* before *September* was out. The total sum of all that died was about 70000.

19. At *Bergen* in *Norway*, Anno 1618 the Plague is represented to have been very terrible, by saying that there died 50 or 60 *per diem*, and that the whole City was in tears,

that the Coffin-makers refused to make Coffins, that parents carried their children, and children their parents to the grave. But forasmuch as it was not mentioned how populous this place was, nor for how many days the Mortality continued, I can make but little estimate of this Plague, by what is above related.

20. The general Observations arising from the above-mentioned particulars, are as followeth :

First, That Northern, as well as Southern Countries are infested with great Plagues ; although in the Southern Countries they are more vehement, and do both begin and end more suddenly.

(111) 21. Secondly, from the year 1652 the || Plague was at *Cracow*, 1653 at *Dantzick* and *Coningsburg*, 1654 at *Copenhagen*, 1655 at *Leyden* and *Amsterdam*, and other Towns in the *Netherlands*, 1656 at *Naples* and *Rome*, 1657 at *Genoa* ; So as it well deserves enquiry, whether the Plague in all these places were a sickness of the same kind, and did successively perambulate the several Countries above-mentioned ; or whether it were a several disease in each place.

22. Thirdly, that the Plague is longer in rising to its height, than in decreasing to the same pitch ; and the proportion thereof, in such cases where it hath most plainly appeared, is about three to two ; for at *Amsterdam* it was eighteen weeks rising, and twelve decreasing ; and at *Leyden* fifteen upon the increase, and ten decreasing.

It may be further observed, that in the four several times of great Mortality, the height was not always in the same month ; for *Anno 1592* it was the second week in *August*, when there died 1550 of all diseases ; in the year 1603 the height was the second week of *September*, when there died 3129 of all diseases ; in 1625 the extremity was in the third week in *August*, when there died 5205. *Anno 1636* the like extremity was in the first week of *October*, there then dying

(112) 4005 of || all diseases. In this place I think fit to intimate, that considering the present increase of the City from *Anno 1625* to this time, which is from eight to thirteen, that until the Burials exceed 8400 *per week*, the Mortality will not exceed that of 1625. Which God for ever avert.

It may be further observed, that the time of the Plagues continuance at the height was of several durations, for *Anno* 1592 it continued from the first week in *July* to the second of *September*, without increasing or decreasing above 100 in 1600; whereas in 1603 it remain'd but three weeks at the state, decreasing near $\frac{1}{4}$ the next week after the height; *Anno* 1625 it remain'd not three weeks at a stay, increasing $\frac{1}{8}$ part the next week before the height, and decreasing as much the next week after. *Anno* 1636 it stood five weeks without increasing or decreasing above $\frac{1}{8}$ part afore-mentioned.

Concerning the disease of the Plague, *Anno* 1592 it increased to $\frac{1}{8}$ of the greatest number that died in twenty weeks; *Anno* 1603, it did the same in eleven; *Anno* 1625, in nine weeks; *Anno* 1636, as it was not so fierce as in the other years, so it was of longer continuance, as hath been else-where noted¹.||

The last thing I shall observe is, that in all the four great (113) years of mortality above-mentioned, I do not find that any week the Plague increased to the double of the precedent week above five times.

Anno 1631. *Ann.* 7. *Caroli* I.

THE number of Men, Women, and Children, in the several Wards of *London*, and Liberties: taken in *August* 1631, by special command from the Right Honourable the Lords of His Majesties Privy Council².

Algate Ward	04763
Bishopsgate	07788
Bassishaw	01006
Breadstreet	02568
Bridg-ward within	02392
Bridg-ward without	18660
Billingsgate	02597

¹ P. 366.

² On this census see Maitland, *London*, II., 742.

	Broadstreet	03503
	Colemanstreet	02634
	Cornhil	01439
	Cripplegate without	06445
	Cripplegate within	04231
	Farrington without	20846
	Farrington within	08770
	Cordwainer	02238
		<hr/>
		89880
(114)	Aldersgate	03594
	Limestreet	01107
	Queenhith	03358
	Vintry	02742
	Tower-ward	04248
	Dowgate	03516
	Langbourn	03168
	Portsoken-ward	05703
	Cheap-ward	02500
	Wallbrook	02069
	Candleweek-ward	01696
	Castle-Baynard	04793
		<hr/>
		38404
	Bartholomew the great	01388
	Bartholomew the less	00506
		38404
		89880
		<hr/>
		130178

▲

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*The Table of Burials, and Christnings,
in London¹.*

<i>Anno Dom.</i>	<i>97 Pari-shes.</i>	<i>16 Pari-shes.</i>	<i>Out-Pari-shes.</i>	<i>Buried in all</i>	<i>Besides of the Plague</i>	<i>Christ-ned</i>
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

(115)

¹ The original bills being lost, it is impossible to check most of Graunt's figures before 1658. Bell's *Remembrancer*, however, gives the christenings, the plague burials, and the aggregate burials, week by week, with the total of each year, for seventeen of the years included in Graunt's table, viz. for 1606—1610, 1625, 1630, 1636—37, and 1640—47. In 13 years Bell's figures agree with Graunt's. The disagreements in the remaining four years are exhibited by the following table :

Year	Christened		Buried of the plague		Total buried (i.e. the plague burials and Graunt's "buried in all")	
	Graunt	Bell	Graunt	Bell	Graunt	Bell
1610	—	—	—	—	1,803 + 7,486 = 9,289	9,087
1641	10,670	10,370	1,375	3,067	1,375 + 11,767 = 13,142	18,291
1642	10,370	10,670	1,274	1,824	1,274 + 11,999 = 13,273	12,167
1646	7,163	7,583	2,365	2,436	2,365 + 10,415 = 12,780	13,532

The small discrepancies in the christenings, in 1641—42 are obviously due to a transposition of figures, and the error is probably Graunt's, since Bell's figures here, as in all the years in question, are the correct footings of his weekly returns. The discrepancies in the number of burials, particularly in 1641, are more serious. Contemporary letters afford a check upon four of Bell's weekly bills as follows : 19—26 August, 1641, Bell's total burials are 610, plague burials, 139; Wiseman to Pennington, 26 August : "131 dying here this week of the pest, and 118 of the small-pox, and 610 in the whole of all diseases." *Cal. State Papers, Dom., Charles I.*, 1641—43, p. 105. 2—9 September, Bell's plague burials are 185; Cogan to Pennington, 9 September : "there died this week of the plague 185." *Ibid.*, 120. 23—30 September, Bell's decrease of plague burials over previous week is 30; Wiseman to Pennington, 30 September : "the sickness, I hope, will every day diminish, [the deaths] being less by 42 than the last [week]." *Ibid.*, 128. 1—7 October, Bell's total burials are 654, plague burials, 239, an

The Table of Burials, and Christnings, in London.						
Anno Dom.	97 Pari- shes	16 Pari- shes	Out- Pari- shes	Buried in all	Besides of the Plague	Christ- ned
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	3285	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	8393	0	9997
1634	2937	4980	2982	10399	1	9855
1635	2742	4966	2943	10651	0	10034
	20694	33495	19327	73505	1603	75774
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

(116)

increase of 24; Wiseman to Pennington, 7 October: "The sickness is increased by 24 this week, there being dead of all diseases 650 persons [perhaps intended as a round figure], whereof 239 of the plague." *Ibid.*, 134. Pennington's correspondents, therefore, substantially confirm Bell's figures for four weeks. If his figures for the remaining weeks of 1641 are equally accurate, Graunt's figures for that year must be far too small.

<i>The Tables of Burials, and Christnings, in London.</i>						
<i>Anno Dom.</i>	<i>97 Pari- shes.</i>	<i>16 Pari- shes.</i>	<i>Out- Pari- shes.</i>	<i>Buried in all</i>	<i>Besides of the Plague</i>	<i>Christ- ned</i>
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	2781	5148	3439	11348	9	7004
1656	3327	6573	4015	13915	6	7050
1657	3014	5646	3770	12430	4	6685
1658	3613	1692 ¹	4443	14979	14	6170
1659	3431	6988	4301	14720	36	5690
	25288	47695	30278	103261	107	51502
1660	3098	5644	2926	12668	13	6971
1661	3804	7309	5532	16645	20	8855
1662	3123	6094	4423	13652	12	10019
1663	3001	5602	4129	12732	09	10292
1664	3448	7166	4829	15448	05	11722

(117)

The Table following contains the Number of *Burials* and *Christnings* in the seven *Parishes* hereafter mentioned, from the year 1636 unto the year 1659^a inclusive; all which time the *Burials* and *Christnings* were jointly mentioned: the five last years the *Christnings* were omitted in the yearly *Bills*. This Table consists of seventeen Columns, the Total of all the *Burials* being contained in the sixteenth Column: which Number being added to the *Total* in the precedent Table of *Burials* and *Christnings*, makes the *Total* of every yearly or general Bill. ||

¹ The total requires 6923 here if 3613 and 4443 be assumed to be correct.

² In the third edition the table was brought down to 1664, but the text stood unchanged.

(119) Note, where there follows a second Number under any year, it denotes those which died that year of the Plague.

Anno Dom.	Westminster		Islington		Lambeth		Stepney		Newington		Hackney		Redriff		Total in the 7 Parishes	
	Bur.	Ch.	B.	C.	B.	Ch.	Bur.	Ch.	B.	C.	B.	C.	B.	C.	Bur.	Ch.
1636	1107	556	99	56	213	137	1895	881	584	155	68	77	90	62	4056	1924
	442		30		45		909		242		14		20		1702	
1637	963	496	94	72	173	137	952	838	183	172	68	70	74	51	2507	1836
	301		17		18		153		16		6		10		521	
1638	1021	563	116	49	221	140	1209	908	255	146	101	69	74	78	2997	1953
	126				8		11								145	
1639	546	543	88	53	195	132	970	956	187	159	84	53	81	52	2151	1948
	4		2				2						1		9	
1640	754	665	94	54	187	142	1106	983	189	194	76	54	53	77	2459	2159
	62		3		6		117						1		180	
1641	697	625	92	76	168	137	1250	1037	170	137	82	73	69	64	2508	2149
	40		5		9		70				4				128	
1642	671	630	98	71	149	124	1270	1158	160	145	78	58	63	76	2489	2262
	37		4		12		20				5				99	
1643	666	592	105	69	177	114	1167	1013	240	147	65	36	42	67	2471	2038
	25		3		45		83		86						244	
1644	570	429	61	55	115	105	1187	933	123	101	54	45	70	82	2180	1750
	35		8		8		269		44		3		17		384	
1645	621	444	55	63	146	114	1171	873	183	119	58	60	50	60	2284	1753
	62		6		3		150		18		7		1		256	
1646	691	503	84	61	137	108	1230	960	156	130	76	63	47	43	2421	1868
	76		8		5		97		14		9		2		203	
1647	739	464	108	56	161	94	1126	926	129	65	88	45	42	44	2393	1688
	114		12		25		155		28		16		4		434	
1648	561	384	68	46	87	57	837	767			57	42	45	59	1635	1305
	41		4				31				6				82	
(120) 1649	558	333	90	44	131	55	838	625			90	49			1807	1106
			1				3								4	
1650	470	413	78	54	88	50	748	572	55	65	61	48	50	62	1550	1264
1651	580	345	107	51	127	49	961	634	172	59	60	30	84	45	2091	1213
1652	649	432	99	36	179	50	1212	657	198	85	72	33	74	37	2483	1330
					1										1	
1653	567	394	69	46	120	54	1064	620	195	76	71	48	69	21	2155	1250
1654	657	401	96	65	166	76	1252	803	236	106	88	31	75	46	257	1526
1655	676	414	95	86	134	128	1199	859	172	120	68	37	62	57	2406	1701
1656	761	498	139	89	176	152	1255	963	248	127	67	46	66	45	2701	1920
1657	705	473	112	67	231	137	1213	876	204	123	96	42	51	31	2612	1749
1658	890	440	113	36	220	32	1486	892	181	99	91	30	48	16	2958	1645
1659	822	415	116	56	193	103	1392	695	138	86	83	50	84	13	2828	1418
1660	783		108		183		1151		114		65		33		2437	
1661	983		102		330		1561		340		102		87		3505	
1662	848		59		210		1531		76		101		77		2902	
1663	793		41		199		1241		188		73		80		2615	
1664	807		50		236		1392		235		80		40		2848	

The TABLE of Males, and Females, for LONDON. (121)

An. Dom.	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
	47739	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	6572	5856	3396	3289
1658	7936	7057	3157	3013
1659	7451	7305	3209	2781
1660	7960	7158	3724	3247
1661	10448	9287	4748	4107
1662	8623	7931	5216	4803
1663	8035	7321	5411	4881
1664	9369	8928	6041	5681
	66400	60843	34902	31802
Total	235247	214658	156750	146231

(122)

(123)

The Table of the Country-Parish¹.

Years	Communi- cants	Wed- dings	Christned			Buried		
			M.	F.	Both	M.	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	20 ²	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
80		21	43	31	74	38	41	79
81		29	29	33	62	34	24	58
82		22	28	29	57	18	21	39
83		22	32	27	59	35	52	87
84		15	46	44	90	22	19	41
85		15	26	21	47	15	27	42
86		18	22	23	45	24	37	61
87		13	34	31	65	43	36	79
1588		15	33	34	67	31	18	49
		185	328	309	637	287	302	589

¹ This table, beginning with 1569, is for a parish of 12 miles compass (p. 393), located in Hampshire (p. 388). Petty's native town of Romsey corresponds entirely to the description. Moreover "The Register of Romsey begins in 1569 y^e 12th year of y^e Reign of Q. Elizabeth—Jan. 1 [i.e. 1570 N. S.] and is divided into 3 Columns viz. Christenings, Weddings, & Burials, in which year there were christ. 73 weddin 13, & Burials 44." Dr John Latham's MS. *Collections for a History of Romsey*, iii. f. 5 (Brit. Mus. Addl. MS. 26776). At f. 14 ff. Dr Latham gives a table of the marriages, baptisms and burials at Romsey from 1570 to 1658. The figures do not agree precisely with those of Graunt's table, but no great importance should be attached to trifling discrepancies as the register was in part carelessly kept and badly preserved, and Latham himself admits (f. 16 b) that other (unspecified) abstracts of it do not agree with his. The general similarity between his figures and Graunt's is much too close to be the result of chance.

² 20 as the total christenings in 1573 is evidently a misprint. The third edition has 70, Latham has 76.

The Table of the Country-Parish.

(124)

Years	Communicants	Weddings	Christned			Buried		Both
			M.	F.	Both	M.	F.	
1589		20	31	27	58	28	16	44
90		16	40	29	69	36	21	57
91		12	37	28	65	35	30	65
92		14	40	25	65	28	19	47
93		20	32	20	52	33	32	65
94		24	34	37	71	16	22	38
95		16	32	28	60	33	28	61
96		9	36	26	62	42	29	71
97		23	23	25	48	53	64	117
98		21	37	29	66	33	23	66
		175	342	274	616	337	219	631
1599		19	45	31	76	21	22	1
600		16	26	34	60	20	26	46
601		16	39	32	71	18	12	30
602		14	31	32	63	29	18	47
603		12	31	38	69	32	39	71
604		21	42	35	77	26	27	53
605		19	47	34	81	21	12	33
606		19	29	41	70	28	23	51
607		27	36	47	83	33	19	52
608		17	40	53	93	21	21	42
		181	366	377	743	249	219	468 ¹

The Table of the Country-Parish.

(125)

Years	Weddings	Christned			Buried		Both
		M.	F.	Both	M.	F.	
1609	23	30	31	61	24	41	65
10	19	46	30	76	33	40	73
11	25	40	41	81	41	32	73
12	20	55	32	87	53	63	116
13	24	41	33	74	47	41	88
14	25	50	35	85	27	36	63
15	22	35	48	83	28	36	64
16	14	38	36	74	27	41	68
17	17	45	31	76	35	28	63
1618	8	37	41	78	23	28	51
	197	417	358	775	338	386	724

¹ The total burials for 1599 have dropped out. The other editions have 43.

The Table of the Country-Parish.

Years	Weddings	Christned		Both	Buried		Both
		M.	F.		M.	F.	
1619	21	37	43	80	26	28	54
20	20	34	51	85	18	30	48
21	21	31	37	68	28	36	64
22	23	45	38	83	20	26	46
23	14	40	36	76	56	31	87
24	19	30	33	63	29	35	64
25	7	37	41	78	30	20	56
26	9	30	35	65	21	29	50
27	18	45	23	68	24	29	53
1628	16	39	36	75	47	42	89
	168	368	373	741	305	306	611
1629	22	53	38	91	46	28	74
30	8	58	45	103	26	27	53
31	20	42	29	71	26	33	59
32	16	43	50	93	15	21	36
33	12	38	65	103	18	11	29
34	23	30	45	75	18	26	44
35	11	39	32	71	18	17	35
36	15	50	37	87	42	48	90
37	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
40	11	44	41	85	35	39	74
41	21	34	29	63	34	39	70
42	21	48	39	87	32	29	61
43	8	30	42	72	59	28	87
44	16	33	26	59	65	72	137
45	10	43	41	84	28	29	57
46	11	32	35	67	24	32	56
47	12	28	46	74	25	21	46
48	9	35	27	62	25	31	56
	137	351	357	708	375	383	758

(126)

The Table of the Country-Parish.

Years	Weddings	Christened			Buried		Both
		M.	F.	Both	M.	F.	
1649	9	22	37	59	46	34	80
50	9	55	31	86	25	27	52
51	7	25	27	52	11	21	32
52	14	34	28	62	20	25	45
53	9	47	24	71	21	14	35
54	15	34	37	71	14	25	39
55	38	35	34	69	28	19	47
56	28	40	30	70	18	15	33
57	37	23	43	66	22	25	47
58	16	39	29	68	13	15	28
	182	354	320	674	218	220	438

(127)

The Table by Decads of years for the Country Parish.

Decads of Years	Married	Christened		Both	Buried		Both
		Males	Females		Males	Females	
15 { 69 78	190	312	302	614	214	221	435
15 { 79 88	185	328	309	637	287	302	589
15 { 89 98	175	342	274	616	337	284	621
1 { 599 608	181	366	377	743	249	219	468
16 { 09 18	197	417	358	775	338	386	724
16 { 19 28	168	368	373	741	305	306	611
16 { 29 38	153	418	413	831	317	319	636
16 { 39 48	137	351	357	708	375	383	758
16 { 49 58	182	354	320	674	218	220	438
	1598	3256	3083	6339	2640	2640	5280

(128)

(129) *The number of the Weddings, Christnings and Burials that were in the Town and Parish of Tiverton, from March 1560 to January 1664; as appeareth by the Registers.*

Years	Weddings	Christned		Both	Buried		Both
		M.	F.		M.	F.	
1560	37	23	29	52	43	28	71
61	51	35	31	66	36	34	70
62	16	59	50	109	32	34	66
63	19	39	50	89	27	15	42
64	19	47	50	97	21	15	36
65	14	51	27	78	26	28	54
66	19	67	44	111	23	12	35
67	23	52	42	94	28	16	44
68	15	50	34	84	25	25	50
69	19	40	37	77	23	38	61
	232	463	394	857	284	245	529
1570	17	51	45	96	45	58	103
71	21	46	26	72	70	68	138
72	35	52	44	96	30	23	53
73	38	55	39	94	22	19	41
74	37	42	50	92	25	28	53
75	32	51	71	122	33	21	54
76	27	62	65	127	43	93	136
77	27	79	46	125	54	76	130
78	38	59	57	116	42	54	96
79	45	56	59	115	35	63	98
	317	553	502	1055	399	503	902
1580	35	61	63	124	36	43	79
81	34	62	64	126	37	39	76
82	34	68	67	135	45	38	83
83	33	54	44	98	31	47	78
84	28	77	59	136	39	43	82
85	11	69	64	133	32	52	84
86	27	42	40	82	49	40	89
87	27	57	63	120	76	94	170
88	36	67	65	132	57	43	100
89	33	83	70	153	47	55	102
	298	640	599	1239	449	494	943

(130)

The Table of the Parish of Tiverton.

Years	Weddings	Christned		Both	Buried		Both
		M.	F.		M.	F.	
1590	39	60	64	124	62	87	149
91	48	56	44	100	268	282	550 ¹
92	43	75	77	152	37	48	85
93	43	63	48	111	37	65	102
94	37	66	98	164	31	47	78
95	38	54	52	106	37	60	97
96	22	60	58	118	51	77	128
97	18	37	29	66	124	153	277 ¹
98	23	44	38	82	45	103	148
99	42	50	73	123	27	27	54
	353	565	521	1146	719	949	1668
1600	38	64	54	118	28	38	66
1	33	52	82	134	28	36	64
2	37	65	62	127	41	42	83
3	52	60	83	143	50	36	86
4	28	75	63	138	27	63	90
5	49	62	68	130	33	48	81
6	37	79	77	156	45	42	87
7	47	89	77	166	34	52	86
8	37	60	86	146	51	64	115
9	34	70	69	139	27	49	76
	392	676	721	1379	364	470	834
1610	31	83	88	171	62	50	112
11	51	83	96	179	39	41	80
12	47	79	70	149	58	45	103
13	38	74	77	151	39	40	79
14	46	90	88	178	42	41	83
15	55	88	84	172	39	44	83
16	24	111	100	211	53	59	112
17	41	99	79	178	57	57	114
18	46	102	79	181	32	44	76
19	30	104	102	206	65	72	137
	409	913	863	1776	486	493	979
1620	42	105	72	177	53	53	106
21	74	111	111	222	61	51	112
22	40	89	104	193	60	86	146
23	52	108	88	196	80	101	181
24	52	95	95	190	60	68	128
25	57	131	117	248	86	61	147
26	66	97	101	198	73	95	168
27	67	143	110	253	98	45	143
28	66	103	114	217	87	98	185
29	77	124	108	232	62	68	130
	593	1106	1020	2126	720	726	1446

(131)

(132)

¹ In 1591 there was plague at Tiverton. The cause of the high mortality in 1597 is obscure. Creighton, *Epidemics*, I. 351, 411.

(133)

The Table of the Parish of Tiverton.

Years	Weddings	Christend		Both	Buried		Both
		M.	F.		M.	F.	
1630	73	117	123	240	104	74	178
31	40	118	100	218	85	92	177
32	63	106	104	210	84	83	167
33	63	114	121	235	75	71	146
34	54	114	95	209	73	91	164
35	82	124	111	235	84	92	176
36	43	135	113	248	85	87	172
37	42	110	98	208	106	142	248
38	62	112	112	224	194	170	364
39	62	119	106	225	115	137	252
	584	1169	1083	2252	1005	1039	2044
1640	66	124	114	238	82	104	186
41	52	122	114	236	83	88	171
42	59	102	136	238	110	128	238
43	54	115	117	232	102	88	190
44	22	76	78	154	232	213	445 ¹
45	47	95	175	270	99	92	191
46	41	61	50	111	3	3	6 Pl.
47	23	116	106	222	7	3	10
48	22	85	67	152	24	17	41
49	16	96	92	188	21	30	51
	402	991	1049	2041	763	766	1529
1650	9	66	79	145	7	9	16
51	9	50	63	113	5	10	15
52	9	80	73	153	48	51	99
53	21	89	219	208	47	78	125
54	108	105	104	206	72	68	140
55	140	87	104	191	87	114	201
56	109	107	90	197	56	86	142
57	102	94	101	195	67	59	126
58	60	70	83	153	77	85	162
59	37	77	78	155	72	80	152
	604	825	891	1716	538	640	1178
1660	27	61	68	129	70	69	139
1	38	83	93	176	73	85	158
2	36	73	56	129	91	95	186
3	35	68	64	132	72	74	146
4	41	68	72	140	98	114	212
	177	353	353	706	404	437	841

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¹ In 1644 there was war typhus at Tiverton. Creighton, *Epidemics*, I. 552-555.

The number of the Weddings, Christnings and Burials that ⁽¹³⁵⁾ were in the Parish of Cranbrooke, from March 26. 1560 to March 24. 1649; (as appeareth by the Register) only in the years 1574 and 1575 the Christnings are wholly omitted, because the Register is very imperfect for the greater part of those years.

Years	Weddings	Christned		Both	Buried		Both
		M.	F.		M.	F.	
1560	20	36	33	69	29	21	50
61	24	46	33	79	23	22	45
62	23	32	26	58	40	31	71
63	15	28	21	49	19	24	43
64	23	29	29	58	10	8	18
65	29	44	29	73	37	34	71
66	25	39	26	65	69	35	104
67	28	42	41	83	36	21	56
68	22	38	44	82	31	31	62
69	22	36	35	71	25	19	44
	231	370	317	687	319	246	565
1570	18	30	44	74	26	36	62
71	21	31	27	58	31	16	47
72	25	35	34	69	24	39	63
73	29	28	25	53	29	21	50
74	23				28	28	56
75	25				18	14	32
76	29	49	42	91	17	16	33
77	16	36	48	84	23	21	44
78	24	42	39	81	19	16	35
79	21	47	44	91	26	18	44
	235	298	303	601	241	225	466
1580	30	47	42	89	26	23	49 Pl.
81	28	61	46	107	32	30	62 18
82	26	58	49	117	52	37	89 41
83	24	59	44	103	24	20	44 22
84	25	53	55	108	24	29	53
85	22	60	52	112	16	14	30
86	17	53	50	103	28	22	50
87	20	45	53	98	28	24	52
88	24	57	59	116	24	21	45
89	19	59	44	103	17	28	45
	235	552	504	1051	271	248	519

(136)

(137)

The Table of the Parish of Cranbrook.							
Years	Weddings	Christned		Both	Buried		Both
		M.	F.		M.	F.	
1590	25	64	58	116	21	17	38
91	26	41	52	93	34	43	77
92	20	59	46	105	39	31	70
93	23	54	47	101	22	17	39
94	22	48	37	85	24	23	47
95	14	55	53	108	35	36	71
96	17	36	42	78	42	25	67 <i>pl.</i>
97	22	37	19	56	112	110	222 181
98	22	47	41	88	27	34	59 <i>pl. 8</i>
99	30	56	40	96	19	20	39
	221	497	429	926	373	356	729
1600	16	48	44	92	16	18	34
1	19	44	41	85	19	29	48
2	26	50	43	93	28	26	54
3	22	68	51	119	36	28	64 <i>pl. 9</i>
4	36	47	61	108	20	24	44
5	23	56	39	95	38	30	68
6	23	42	44	86	30	31	61 <i>pl. 1</i>
7	29	51	65	116	48	30	78
8	13	56	35	91	33	31	64
9	16	40	37	77	43	46	89 <i>pl. 1</i>
	223	502	460	962	311	292	603
1610	26	45	42	87	32	42	74
11	27	39	44	83	44	53	97
12	16	44	39	83	50	43	93
13	22	43	41	84	46	50	96
14	22	50	44	94	55	35	90
15	35	56	44	100	64	61	125
16	29	35	54	89	40	47	87
17	20	49	52	101	50	48	98
18	32	38	51	89	37	58	95
19	32	47	40	87	50	44	94
	261	446	451	897	468	481	949
1620	27	59	61	120	45	52	97
21	26	54	50	104	40	46	86
22	14	61	65	126	27	28	55
23	18	37	37	74	33	34	67
24	45	59	60	119	44	31	75
25	22	44	59	103	54	56	110
26	26	36	45	81	48	49	97
27	25	45	50	95	36	38	74
28	38	57	60	117	56	70	126
29	48	60	58	118	51	44	95
	289	512	545	1057	434	448	882

(138)

The Table of the Parish of Cranbrook.

Years	Weddings	Christned			Buried		
		M.	F.	Both	M.	F.	Both
1630	25	58	64	122	41	52	93
31	15	51	46	97	46	42	88
32	20	57	56	113	56	52	108
33	19	73	55	128	44	44	88
34	30	63	52	115	46	51	97
35	18	54	57	111	56	50	106
36	15	52	55	107	39	60	99
37	31	61	85	126	47	49	96
38	22	49	56	105	73	80	153
39	28	31	36	67	63	51	114
	223	549	542	1019	511	531	1042
1640	30	65	50	115	70	54	124
1	20	51	62	113	51	36	87
2	27	47	40	87	39	53	92
3	20	68	63	131	68	59	117
4	23	51	60	111	37	49	86
5	31	55	46	101	30	46	76
6	14	63	51	114	69	65	134
7	18	44	36	83	72	47	119
8	6	35	23	58	55	60	115
9	7	37	26	63	58	48	106
	196	516	460	976	549	517	1066

(139)

Dublin, A Bill of Mortality from the 26 of July to the 2d of (140) August 1662.

	Baptiz.	Plague	Spot Fea.	Small Pox	Consum.	Feaver	Aged	Rickets	Flux
Saint Michans	1			1			1		
S. Katharines & S. James	2								1
S. Audens					1				
S. Michaels	2				2				2
S. Johns							2		2
S. Nicholas without	5				1		1		1
S. Nicholas within	1								1
S. Warbrows & S. Andrews	2				1				
S. Keavans					1				
S. Brides	1				2				

The Total Baptized 14.

Total Buried 20.

Jacob Thring, Reg. ||

OBSERVATIONS

O F

Major *John Graunt*.

WHEREAS in the Month of *December*, in the Year 1672, there were Christen'd in the several Parishes of the City and Suburbs of *Paris*¹ 1366, and Weddings 68, and Buried 1153. yet of the Reformed Religion, in the same space of Time and Place, there were Christen'd but 27, and Buried

¹ The origin, or at least the publication of the Paris bills may be traced, with some degree of probability, to the influence of Graunt's *Observations*. The review of the *Observations* in the *Journal des Sçavans*, 2 August, 1666, begins "C'est une chose particuliere aux Anglois de faire des Billets de mortalite,"—words which seem to indicate that no similar bills were then published in Paris. The code of April 1667, provided that "estant important au public, pour la sante et pour la subsistance des habitans, d'en connoistre l'etat en tout terms et d'observer soigneusement les causes qui augmentent ou diminuent le peuple de chacun des quartiers de Paris, il sera fait, tous les seconde jours du mois, une feuille qui contiendra le nombre des baptemes, des mariages et des mortuaires du mois precedant et de chacune des paroisses en particulier." Serpillon, *Code civil, ou commentaire sur l'ordonnance du mois d'Avril, 1667*. Paris, 1776, pp. 336—338, titre 20, articles 8—14; *Recherches stat. sur la Ville de Paris*, II. pp. xiii—xiv; Levasseur, *La statistique officielle en France*, in *Journal de la Soc. de stat. de Paris*, XXVI. 225, 279, June, 1885. The close similarity of these Paris bills to the London bills lends probability to the assertion of Sir Peter Pett, that the idea was suggested to the counsellors of Louis XIV. by Graunt's *Observations*. *Happy future State of England*, (written 1680) p. 249.

but 14. At a medium being compared to the gross sum, the Protestants in *Paris* are but as one to 65.

A further Observation may be made; That whereas in the whole Year of 1672, there were Buried 17584, and the Christenings then were 18427, which difference || between ⁽¹⁴²⁾ Christening and Burials was very agreeable with the difference formerly in the City of *London*, before Phanaticism and the Anabaptists were known in those Parts: But in the same Year of 1672 in the City of *London* and Places adjacent, the Burials were 18230, and the Christenings but 12563, By which it plainly appears that $\frac{1}{3}$ of the Inhabitants of the Places aforesaid, are such as do not conform to the Doctrin and Discipline of the Church of *England*.

As concerning the common Question¹, Whether *Paris* or *London* hath most Inhabitants, my Answer must be fram'd after this manner, upon some Observations made upon the numbers of Burials of each City.

I find that in the City and Suburbs of *Paris* in the Years 1670, 1671, and 1672, the total number of the Burials was 56443, and in the Years aforesaid in the City of *London*, Suburbs, and Places adjacent (as appears by the Annual Bills of Mortality) was Buried 54157.

But since that *Hackney*, *Lambeth*, *Newington*, *Islington*, *Rotherhith*, *Stepney* and *Westminster*, although put into the Bills of Mortality, they cannot properly be reckon'd as parts of the City of *London* (*Westminster* being a distinct City of it self, and the others || above-named Country Villages) and ⁽¹⁴³⁾ there having been Buried in the Places last named in the three Years aforesaid (as appears by the said Annual Bills) 10000, which being deducted out of the number aforesaid, the remaining number is 44157, upon which I think the Comparison must be made.

By which it appears that *Paris* hath exceeded the City of *London* in the number of Burials 12286, which number is between a fourth and a fifth of the said number of 56443,

¹ The discussion on London and Paris was continued by Petty in his *Two Essays*.

which is the Proportion of the difference in the number of Inhabitants; the City of *Paris* having more than a fourth, and yet not a fifth¹ more than the City of *London*. ||

(144) *Christenings, Marriages, and Burials in the City of Paris, 1670.*

	Christenings.	Marriages.	Burials.
<i>January.</i>	1596	353	2350
<i>February.</i>	1712	589	2159
<i>March.</i>	1661	048	2033
<i>April.</i>	1351	267	1882
<i>May.</i>	1342	374	1714
<i>June.</i>	1222	354	1644
<i>July.</i>	1348	420	1540
<i>August.</i>	1420	314	2162
<i>September.</i>	1408	343	1845
<i>October.</i>	1312	313	1502
<i>November.</i>	1324	479	1290
<i>December.</i>	1120	076	1340
Total	16810 ²	3930	21461

(145) *Christenings, Marriages, and Burials in the City of Paris, 1671.*

	Christenings.	Marriages.	Burials.
<i>January.</i>	1675	548	1150
<i>February.</i>	1656	489	1068
<i>March.</i>	1860	56	1218
<i>April.</i>	1595	447	1350
<i>May.</i>	1478	324	1431
<i>June.</i>	1331	334	1219
<i>July.</i>	1424	337	1358
<i>August.</i>	1606	324	1502
<i>September.</i>	1507	327	1897
<i>October.</i>	1587	321	1753
<i>November.</i>	1560	437	2709
<i>December.</i>	1253	42	1743
Total	18532	3986	17398

¹ Obviously a slip. It should be "more than a fifth and yet not more than a fourth."

² A misprint for 16,816, which is the correct footing, see *Recherches statistiques*, tables, 53.

Christenings, Marriages, and Burials in the City of Paris, 1672. (146)

	Christenings.	Marriages.	Burials.
<i>January.</i>	1837	325	1930
<i>February.</i>	1920	625	1554
<i>March.</i>	1636	108	2008
<i>April.</i>	1572	130	1664
<i>May.</i>	1528	332	1551
<i>June.</i>	1359	349	1602
<i>July.</i>	1414	334	1323
<i>August.</i>	1498	271	1407
<i>September.</i>	1379	278	1216
<i>October.</i>	1481	309	1119
<i>November.</i>	1437	433	1057
<i>December.</i>	1366	068	1153
Total	18427	3562	17584 ^{ll}

Notes to the Table shewing how many died weekly.

¹ Although Graunt himself makes little use of this table, the discrepancies between various parts of it, its divergence from the figures which Bell gives, and the criticisms which Creighton has passed upon it, necessitate an examination of its authenticity. The loss of all sets of the original bills before 1658 forces the inquirer to compare the table for the earlier years with figures drawn, for the major part, from secondary sources not always trustworthy. Of these sources the chief are: A, an original printed bill for the week ending 20 October 1603, preserved at the Guildhall library (in "Political Tracts, 1680, PP.'). Upon the margin of this bill are printed summaries of former visitations. B, Bell's *London's Remembrancer* (see Introduction). C, a broadsheet beginning "Lord have Mercy upon us," printed for M. S. junior, and dated 1636 (Brit. Mus. 816. m. 9. (23)). D, a broadsheet beginning "Londons Lord have Mercy upon us. Written by H. C[rouch]. Printed for Richard Harper," 1637. E, a broadsheet entitled "London's Lord have Mercy upon us. Printed by T. Mabb for R. Burton, and R. Gilberson," and bringing its figures down to 18 July, 1665. (Brit. Mus. 816. m. 9. (25)). F, a broadsheet entitled "London's Loud Cryes to the Lord by Prayer. Made by a Reverend Divine. Continued down to this present day August 8, 1665. Printed by T. Mabb for R. Burton, and R. Gilberson" (Brit. Mus. 816. m. 9. (26)). G, a broadsheet entitled "London's Lord have Mercy upon us. A true Relation of Seven modern Plagues or Visitations in London," bringing its figures down to 31 Oct., 1665 (Brit. Mus. 816. m. 9. (24)). Of these only the two first are presumptively worthy of confidence, the remainder being the product of those "ignorant scribblers" whose "many and gross mistakes" Bell, as clerk to the Company of Parish Clerks, thought it his duty to rectify out of the undeniable records of those times. Nevertheless the broadsides were printed by persons who might have had access to original bills, now destroyed, and inasmuch as they give figures for some years concerning which Bell himself is silent, use has been made of them in default of better information. There are also two editions of the "Reflections upon the Bills of Mortality" (1665) which Bell particularly condemns, but the book adds nothing useful to the broadsheets upon which it is evidently based. In the following notes the authorities are referred to by the letters (A, B, etc.) prefixed to them above.

² The figures for 1592, although confirmed by D, E, F, G and H, are worthy of no confidence. The reasons for rejecting them entirely are three:

First, For the London of 1592 they are preposterous. Creighton reports (*Epidemics*, i. 341—344) that the total of burials in the city, liberties and suburbs for the five years 1578—1582 (eight weeks missing) was 24,802, of which 8,288 were caused by the plague, and that the total of christenings was 16,470. From abstracts of the weekly bills for 1597—1600 preserved at the Bodleian Library (Ashmole MS., 824, f. 196—199), but apparently unknown to Dr Creighton, it

A the Plague, in the Years 1665.

Buried of all of all Diseases in
the Year Year 1636⁹.

Buried of all Diseases in
the Year 1664⁷.

		Total	Pla.			Total	Plag.	
March 17		119	2	December 27		291		
March 24		205	4	January 3		349		
March 31	These Pa- aded: estmin- th Pa- y New- riff Pa- Ising- y and ishes.			10		394		
April 7				17		415		
April 14				24		474		
April 21				31		409		
April 28				February 7		393		
May 5				14		461	I	
May 12			285	14	21	393		
May 19			259	17	28	396		
May 26			251	10	March 7		441	
June 2			308	55	14		433	
June 9		299	35	21		365		
June 16		330	62	28		353		
June 23		339	77	April 4		344		
June 30		345	87	11		382		
July 7		381	103	18		344		
July 14		304	79	25		390	2	
July 21		352	104	May 2		388		
July 28		215	81	9		347	9	
August 4		372	104	16		353	3	
August 11		365	120	23		385	14	
August 18		423	151	30		399	17	
August 25		491	206	June 6		405	43	
September 1	I	538	283	13		558	112	
September 8	8	638	321	20		611	168	
September 15	5	787	429	27		684	267	
September 22	r I	1011	638	July 4		1006	470	
September 29	8	1069	650	11		1268	727	
October 6	15	1306	865	18		1761	1089	
October 13	22	1229	775	25		2785	1843	
October 20	29	1403	928	August 1		3014	2010	
October 27	5	1405	921	8		4030	2817	
November 3	13	1302	792	15		5319	3880	
November 10	20	1002	555	22		5568	4237	
November 17	27	900	458	29		7496	6102	
November 24	r 3	1300	838	September 5		8252	6988	
December 1	10	1104	715	12		7690	6544	
December 8	17	950	573	19		8297	7165	
December 15	24	857	476	26		6460	5533	
December 22	r I	614	321	October 3		5720	4929	
	8	459	167	10		5068	4327	
The Total of	15	385	85	17		3219	2665	
been buried				24		1806	1421	
Whereof of the				31		1388	1031	
of the Burials				November 7		1787	1414	
is		23359		14		1359	1050	
of the Pl.		10400		21		905	652	
				28		544	333	
				December 5		428	210	
				12		442	243	
				19		525	281	
				The Total of the Burials				
				this year is		97306		
				Whereof of the Pl.		68596		

appears that the corresponding figures for those four years were 16,935 burials, 86 burials of the plague, and 17,906 christenings respectively. (The summaries are printed at length on pp. 433—435.) Thus it becomes possible to make a comparison of weekly averages :

	Total burials	Of the plague	Other causes	Christenings
1578—1582	98	33	64	65
1592	644	271	373	104
1597—1600	82	1	81	86

Second, The various figures in each column bear such a relation to one another as at least suggests fraud. If we disregard the week ending 21 July and the last week in the column of total burials, and also disregard the first four weeks and the weeks ending 23 and 30 June in the plague column, the remaining significant integers in the units place in both columns are arranged in pairs whose sum is invariably ten. For example, the figures at the bottom of the plague column run 9 & 1, 6 & 4, 3 & 7, 9 & 1, 2 & 8, etc. throughout.

Third, Neither total printed is the true sum of the figures at whose foot it stands. A note upon the bill of 1603 (A) declares that "in the last visitation, from 20 December, 1592 to the 23. of the same moneth in the year 1593 there died in all 25886. Of the Plague in and about London, 15003." This confirms Graunt's total of all buried as to numbers, but not as to time covered. His total of plague deaths may have originated in a misprint. The true sums of his columns are 26,407 and 11,106 respectively.

In addition to these reasons, Bell's chronological objection, as quoted in the Introduction, should also be noted. On the whole we must consider Graunt's figures for 1592 spurious.

³ If 1146 (A, D, E, F, and G) be substituted for 1149 on 13 October and 585 (D, E, F, and G) be substituted for 545 on 10 November, Graunt's totals become the correct footings of his columns, and the figures are, doubtless authentic as far as they go. But they do not cover the whole year, they omit the burials in the out parishes before 14 July, and they omit entirely the burials in Westminster, the Savoy, Stepney, Newington, Islington, Lambeth and Hackney. The bill of 20 October, 1603 (A), informs us that, from the beginning of the plague to that date there were "buried in all within the 7 places last aforementioned 4378, whereof of the plague, 3997." Cf. Creighton, i. 477.

⁴ The figures are probably authentic, being confirmed for four scattered weeks by letters at the Record Office. *Cal. S. P. Dom.*, 1625—26, pp. 84, 144, 179. But the columns as printed add up 50,823 and 35,400 respectively, and the corrections noted below do not explain Graunt's totals. The figures, furthermore, omit Westminster, etc., where there were buried in the whole year 8,736, of whom 5,896 of the plague. *Ibid.*, 84, 184. Creighton (p. 508) gives the figures, from Bell, for the weeks preceding 17 March, making the total mortality for the year, including Westminster, 63,001, whereof of the plague 41,313, and these totals are further confirmed by an original yearly bill. *Cal. S. P. D.*, 1625—26, pp. 177, 184.

Corrections of specific numbers : 12 May, for 232 read 332 (B, D, E, F, G); 16 June, for 161 read 165 (B, D, E, F, G); 14 July, for 1781 read 1741 (B only);

29 Sept., for 236 read 1236 (B, D, E, F, G, 3rd and 4th editions of the *Observations*); 1 Dec., for 190 read 290 (D, E, F, and G; B has 190).

⁵ The figures are authentic and, with one exception, correct. 16 Dec. B, E & G have 217 where Graunt has 212. The columns as printed add 6193 and 1166 respectively. The figures given at the foot have no obvious relation to the columns beneath which they stand. They are, apparently, totals for the full year, as they sum up, without Westminster, at 10,544 burials and 1,344 plague burials, whereas the corresponding figures on p. 116, confirmed by D, E, F and G, are 10,554 and 1,317.

⁶ Bell here fails us, as he gives the figures (reproduced by Creighton, i. 530) for London without Westminster and the six parishes. Graunt's figures, which include Westminster, etc., are confirmed by D, E, F and G, save as specifically noted below. The columns, as printed, foot 23,902 and 12,101 respectively. The totals given by Graunt have nothing to do with the columns beneath which they stand, but agree with Bell's totals for the whole year, Westminster omitted. By adding them to the total deaths and the plague deaths at Westminster, etc., which, according to the table on p. 410, were 4056 and 1702 respectively, we get a grand total of 27,415 burials, whereof of the plague 12102. These results agree with D, E, F, and G.

Corrections of specific numbers: 2 June, for 77 read 67 (D, E, F, G); 21 July, for 365 read 395 (D, E, F); 4 Aug., for 491 read 461 (D, E, F, G); 13 Oct., for 1302 read 1402 (G only).

⁷ The third edition of the *Observations* carries this table down to 4 July, the 4th to 26 September. Comparison of the figures with the original weekly bills shews the necessity of correcting Graunt's figures as follows: 27 December insert one burial of the plague; 14 February, read 462 for 461; 25 April, read 398 for 390; 30 May, read 400 for 399; 20 June, read 615 for 611; 11 July, read 725 for 727; 29 August, read 7490 for 7496. With these alterations, Graunt's footings are correct.

Advertisements for the better understanding (147)
of the several Tables: videlicet,

Concerning the Table of Casualties consisting of thirty Columns.

THE first Column¹ contains all the *Casualties* hapning 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*². ||

The 5 next Columns are the 8 years from 1629 to 1636 (148) 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 three years together, taken at 10 years distance from each other; that the distant years, as

¹ In fact the first column was omitted from the table in the fourth and fifth editions, leaving but twenty-nine.

² "One could wish that the worthy citizen had made no difficulty about the size of his paper. The omitted years are not only those of great political revolution, which may have had an effect upon the public health, but they are of special interest for the beginning of that great period of fever and smallpox in London which continued all through the 18th century." Creighton, I. 532.

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 all the 15 Quaternions, or 25 years¹.

The Number 229250 is the total of all the Burials in the said 20 years, as 34190 is of the Burials in the said three distant years. Where note, that the $\frac{1}{3}$ of the latter total is 11396, and the $\frac{1}{6}$ of the former is 11462; differing but 66 from each other in so great a sum, *videlicet* scarce $\frac{1}{100}$ part. ||

(149) *The Table of Burials and Christnings, 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 *Christnings* is not to be trusted, the neglects of the same beginning about that year: for in 1642 there are set down 10370, and about the same number several years before, after which time the said *Christnings* decreased to between 5000 and 6000, by omission of the greater part.

Thirdly, The several Numbers are cast up into *Oftonaries*, that Comparison may be made of them as well as of single years. ||

(150) *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.

¹ Should be "five quaternions or twenty years."

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 *Decads* beginning at 1569, and continuing until 1658, and the later 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, &c.

FINIS.

APPENDICES TO GRAUNT'S OBSERVATIONS.

APPENDIX I.

Though Graunt appears to have written, in addition to the "Observations," something on the advance of excise and something on religion, it is probable that nothing else from his pen has been preserved save the following brief note in Birch's *History of the Royal Society*, vol. 1. p. 294 :—

19 Aug. 1663. "Mr Graunt brought in his account of the multiplication and growth of carps and salmons ; which was ordered to be registered, as follows :

A pond new digged in Deptford for horses and other cattle to water in the year 1658, two male and two female carp being then put in with intention to breed ; in the year 1662 the pond being tainted with fish, so that the cattle refused to drink, there were then taken out of this pond eight hundred, seventy and odd carps, of about nine inches in length, some more, some less ; a great number of smaller fish being left for breeders.

And in the Severne and elsewhere it hath been experimented, by fastening of small pieces of tape or silk through the gills of young salmon, that in two years they have advanced to near three foot in length."

APPENDIX II.

The following abstract of the weekly bills of mortality of London for the years 1597—1600, hitherto unprinted, are among the Ashmole MSS. (824, f. 196—199) in the Bodleian Library. They fill a portion of the gap between the series of bills for 1578—1583 printed by Dr Creighton and Graunt's tables. They indicate the growth of population in the urban district and establish affirmatively the comparative freedom of the city from the plague during four years of peculiar interest in the history of the English drama.

1597

Week ending	Buried	Whereof of the Plague	Christened	Week ending	Buried	Whereof of the Plague	Christened
Jan. 6	83	0	105	July 7	123	1	81
13	84	0	101	14	129	3	81
20	82	0	103	21	131	1	84
27	91	0	114	28	129	1	63
Feb. 3	97	0	98	Aug. 4	87	0	81
10	102	0	100	11	104	2	71
17	109	1	77	18	130	0	60
24	99	1	84	25	109	1	75
Mar. 3	134	1	100	Sept. 1	121	0	76
10	119	0	109	8	124	3	78
17	126	4	113	15	87	2	66
24	142	1	88	22	119	0	92
31	108	0	103	29	98	0	74
Apr. 7	115	3	92	Oct. 6	89	1	70
14	116	2	90	13	86	0	82
21	117	1	98	20	83	2	73
28	127	2	76	27	95	0	68
May 5	122	4	80	Nov. 3	82	0	81
12	137	3	76	10	91	0	56
19	115	2	77	17	85	0	84
26	120	1	76	24	89	0	89
June 2	125	1	73	Dec. 1	80	1	59
9	109	0	66	8	88	0	73
16	132	0	87	15	110	1	61
23	112	1	69	22	105	0	73
30	115	1	84	29	72	0	66
					<u>5584</u>	<u>48</u>	<u>4256</u>

1598

Jan. 5	89	1	64	Mar. 16	89	0	83
12	95	0	86	23	80	1	67
19	90	2	78	30	86	0	80
26	72	0	82	Apr. 6	73	1	92
Feb. 2	73	0	86	13	90	1	85
9	82	0	76	20	91	1	72
16	79	0	70	27	94	1	73
23	85	0	82	May 4	82	0	75
Mar. 2	70	0	87	11	74	0	60
9	89	1	89	18	76	1	67

Appendices to Graunt's Observations.

Week ending	Buried	Whereof of the Plague	Christened	Week ending	Buried	Whereof of the Plague	Christened
May 25	59	0	64	Sept. 14	61	1	86
June 1	82	0	70	21	55	0	93
8	65	1	74	28	70	0	72
15	71	1	66	Oct. 5	41	0	83
22	69	2	72	12	62	0	101
29	51	1	72	19	57	0	104
July 6	79	0	85	26	63	0	100
13	68	0	74	Nov. 2	73	0	91
20	65	1	71	9	65	0	81
27	75	0	89	16	72	0	95
Aug. 3	64	0	88	23	58	0	106
10	72	1	78	30	58	0	102
17	80	0	74	Dec. 7	73	0	92
24	54	1	67	14	70	0	96
31	74	0	89	21	80	0	80
Sept. 7	71	0	84	28	76	0	83
					<u>3798</u>	<u>18</u>	<u>4236</u>

1599

Jan. 4	57	0	86	June 7	76	0	73
11	91	0	86	14	75	0	81
18	74	0	92	21	76	0	92
25	69	0	90	28	64	0	64
Feb. 1	92	0	93	July 5	89	1	85
8	82	0	103	12	70	0	77
15	90	1	83	19	99	2	86
22	111	0	92	26	82	0	95
Mar. 1	86	0	95	Aug. 2	108	1	92
8	74	0	107	9	76	0	75
15	97	1	106	16	88	0	98
22	80	1	89	23	92	0	87
29	79	1	80	30	101	0	98
Apr. 5	90	0	90	Sept. 6	82	0	89
12	89	1	90	13	102	2	95
19	84	2	86	20	104	0	89
26	91	0	96	27	103	0	106
May 3	81	0	85	Oct. 4	93	1	97
10	88	0	74	11	87	0	102
17	53	0	68	18	72	0	95
24	79	0	111	25	84	1	98
31	81	1	93	Nov. 1	84	0	79

London Bills for 1599 and 1600.

435

Week ending	Buried	Whereof of the Plague	Christened	Week ending	Buried	Whereof of the Plague	Christened
Nov. 8	81	0	103	Dec. 6	77	0	98
15	57	0	87	13	59	0	76
22	73	0	100	20	61	0	111
29	72	0	90	27	72	0	61
					<u>4277</u>	<u>16</u>	<u>4674</u>

1600

Jan. 3	48	0	101	July 3	70	0	62
10	60	0	85	10	59	1	95
17	58	0	85	17	58	0	81
24	66	0	103	24	80	0	101
31	79	0	96	31	57	0	83
Feb. 7	76	0	94	Aug. 7	58	0	93
14	70	0	87	14	62	0	113
21	68	0	100	21	59	0	104
28	65	0	90	28	93	0	80
Mar. 6	59	0	85	Sept. 4	66	0	106
13	69	0	92	11	45	0	90
20	60	0	92	18	63	0	88
27	63	0	100	25	55	0	93
Apr. 3	72	0	128	Oct. 2	67	0	113
10	70	0	103	9	55	0	95
17	59	0	71	16	48	0	94
24	62	0	74	23	61	0	104
May 1	66	0	56	30	68	2	94
8	67	0	70	Nov. 6	41	1	101
15	64	0	87	13	52	0	111
22	73	0	74	20	61	0	101
29	69	0	82	27	61	0	90
June 5	57	0	78	Dec. 4	69	0	111
12	65	0	71	11	64	0	88
19	58	0	86	18	56	0	110
26	64	0	83	25	61	0	86
					<u>3276</u>	<u>4</u>	<u>4760</u>



QUANTULUMCUNQUE

CONCERNING MONEY.

1682

NOTE ON THE "QUANTULUMCUNQUE."

PETTY'S *Quantulumcunque* concerning Money was suggested, apparently, by the project of recoinage which was already under discussion when he came to London in June, 1682. The earliest allusion to the book occurs in his letter of 5 September to Southwell: "I have writ three sheets in answer to Thirty-one Questions concerning Money. If it take, for I renounce all judgment of my own, you shall have a copy¹." These words, taken in connection with the fact that Halifax could not have been addressed as "Lord Marquess" earlier than 22 August, 1682², cast some suspicion upon the date of 1681 which is assigned to the *Quantulumcunque* by Harleian MS. 1223 in the British Museum. This MS., moreover, appears to be of the eighteenth century, rather than of the seventeenth, and the pages containing the *Quantulumcunque* (ff. 169 *seq.*) are very carelessly written. Everything considered, the tract must be assigned to August or September, 1682.

In 1695, when the recoinage was imminent, the *Quantulumcunque* was privately printed³ in a quarto edition which has been followed in the present reprint. Of the alleged earlier editions in octavo⁴ I have failed to find a copy.

¹ Thorpe, *Cat. lib. MSS. bibl. Southwellianæ*, 405, Fitzmaurice, 252.

² Doyle, *Official Baronage*, II. 93.

³ Massie, *Observations relating to the Coin*, 32.

⁴ *Bibliography*, 10.

Sir William Petty's⁽¹⁾

Quantulumcunque concerning Money, 1682.

To the Lord Marquess of *Halyfax*.

Suppose that 20s. of new mill'd Money¹ doth weigh 4 Ounces *Troy*, according to Custom or Statute. Suppose that 20s. of old *Eliz.* and *James's* Money, which ought also to weigh four Ounces *Troy*², doth weigh three Ounces *Troy*; and vary variously between 3 and 4 Ounces, *viz.* none under 3, and none full 4.

Suppose that much of the new mill'd regular Money is carried into the *East-Indies*, but none of the old light and unequal Money.

QUESTIONS.

Qu. 1. *Whether the old unequal Money ought to be new Coined, and brought to an equality?*

Answ. It ought: Because Money made of Gold and Silver is the best Rule of Commerce, and must therefore be equal, or else it is no Rule; and consequently no Money, and

¹ English money was first generally milled in 1662. Lowndes, *Report*, 95—96.

² An approximate weight. In fact 12 ounces Troy of standard silver were coined into 62 shillings.

but bare Metal which was Money before it was worn and abused into Inequality.

Qu. 2. *At whose Charge?*

Answ. At the States Charge, as it now is: Because the Owner was no cause of its Inequality, but the States neglect in preventing and punishing such Abuses, which are remedied by new Coinage.

Qu. 3. *Of what weight and fineness ought the new Shilling to be?*

Answ. Of the same with the other present new Money, and which the old was of, when it was new: Because all must be like, all according to the Statute; and all fit to pay ancient Debts, according to what was really lent. ||

2) Qu. 4. *Suppose 20s. of old Money may make but 18s. of new, who shall bear the loss of the two shillings?*

Answ. Not the States: Because men would clip their own
 ✓ Money: But the Owner himself must bear the loss, because he might have refused light and defective Money, or put it away in time; it being sufficient that he shall have new regular beautiful Money for his old unequal Money, at the States Charge, Ounce for Ounce weight.

Qu. 5. *After this Reformation of Coin, Will more Silver be carried out of England, suppose into the East Indies, then before; and to the Damage of England?*

Answ. Somewhat more: But none to the Damage of England, *Eo Nomine*; but rather to its Profit: Because the Merchant will be considered for the Manufacture of the new Money; besides the Metal of it, as he only was when he carried out *Spanish Reals*.

Qu. 6. *Whereas the Merchant carries Scarlet and Silver to the Indies, will he not now carry only the new coined Silver?*

Answ. The Merchant will buy as much Scarlet as he can for 100 new Shillings, and then consider whether he shall get more Silk in the *Indies* for that Scarlet than for another 100 of the like Shillings: And, according to this Conjecture, he will carry Scarlet or Shillings *in specie*, or part one, part the other, if he be in doubt.

Qu. 7. *But will not England be impoverished by Merchants carrying out the said 100 Shillings?*

Answ. No, if he bring home for them as much Silk as will yield above 100 Shillings, (perhaps 200 Shillings) in Spain, and then bring the same 200 into *England*: Or, if he bring home as much Pepper as an *English* man will give him 200 of the like Shillings for. So the Merchant and *England* shall both Gain by Exporting the 100 Shillings¹.

Qu. 8. *But if the new Shilling were but $\frac{3}{4}$ ths of the weight as formerly, then the Merchant would not meddle with them at all, and so secure this fear of Impoverishment?*

Answ. The Merchant would Export then, just as before; Only he will give but $\frac{3}{4}$ so much Pepper, or other *Indian* Goods, for the new retrenched Shilling as he did for the old: And would accept in *India* $\frac{3}{4}$ as much Pepper as he formerly had for the old: And consequently there would be no difference, but among a few such Fools as take Money by its name, and not by its weight and fineness.

Qu. 9. *If a Shilling was by new Coinage reduced to $\frac{3}{4}$ of its present weight, should we not thereby have $\frac{1}{3}$ more of Money than now we have, and consequently be so much the richer? ||*

Answ. You would indeed have $\frac{1}{3}$ part more of the new (3) christned Shillings; but not an Ounce more of Silver, nor Money; nor could you get an Ounce more of Forreign Commodities for all your new multiplied Money than before; Nor even for any Domestick Commodities; but perhaps a little at first from the few Fools above mentioned. As for Instance; Suppose you buy a Silver Vessel from a Goldsmith weighing 20 Ounces, at 6s. *per* Ounce, making 6 Pounds² or 24 Ounces of Coined Silver; now suppose that the said 6 Pounds were reduced from weighing 24 Ounces to weigh but 18 Ounces upon the new Coinage; but be still called 6 Pound even by the King's Proclamation; Can it be imagined that the Goldsmith will give his Vessel weighing 20 Ounces of wrought, for 18 Ounces of unwrought Silver? For the Workmanship of

¹ Cf. Mun, *England's Treasure*, ch. iv., pp. 19—27 of Ashley's edition.

² I.e., six pounds sterling, which would weigh 24 ounces Troy upon Petty's assumption.

Money is of little value. Now the Absurdity is the same in all other Commodities, though not so demonstrable as in a Commodity whose Materials is the same with Money.

Qu. 10. *Cannot Authority Command that men should give as much Commodity for the new retrencht Money, as for the old which weighed $\frac{1}{3}$ part more?*

Answ. Then the effect of such Authority would also be to take away $\frac{1}{3}$ of all mens Goods; which are Commodities beyond Seas; and give the same to Forreigners, who would have them for $\frac{3}{4}$ of the usual quantity of Silver: And the same Authority would take away from the Creditor $\frac{1}{3}$ of the Money which was due before the Proclamation.

Qu. 11. *Whereas you suppose retrenching $\frac{1}{4}$ in the new Coinage; Suppose it was but $\frac{1}{10}$, how would the matter be then?*

Answ. Just the same: for *Magis & minus non mutant speciem*: But it were better you supposed that one Shilling were to be taken for 10 or 20, then the Absurdity would be it self so visible, as to need no such Demonstration, as is needful in such small matters as Common Sence cannot discern: For if the wealth of the Nation could be decupled by a Proclamation, it were strange that such Proclamations have not long since been made by our Governours.

Qu. 12. *Will not some men, having occasions to buy Commodities in Forreign Parts, carry out all Money, and so not Vend or Export our own Commodities at all?*

Answ. If some *English* Merchants should be so improvident, yet the Forreign Merchants would buy up such *English* Commodities as they wanted, with Money brought (4) into *England* from their respective || Countries, or with such Commodities as *England* likes better than Money. For the vending of *English* Commodities doth not depend upon any other thing, but the use and need which Forreigners have of them. But were it not a folly for an *English* man not to carry Lead into *Turkey*; but go thither with Money, in his Ballast, and so loose the Freight of the Lead, which he might sell there; And that a Ship should come from *Turkey* with Money, in her Ballast also, to fetch Lead from *England*, which might have been carried at first by the *English* Ship? No:

The Art of a Merchant is to consider all those Matters, so as no Prince's Proclamation concerning the Weight and Denominations of Coins, signifies anything to Forreigners when they know it, nor to his own Subjects *pro futuro*, what e're Disturbances it may make amongst them *pro præterito*. We say again; it were better for a Prince owing 20s. to say he will pay but 15s. than disguising his own particular purpose, to say that all Landlords shall henceforth take 15s. Rent for 20s. due to them by their Tenants Leases; and that he who hath lent 100*l.* on the *Monday*, (the Proclamation of Retrenchment coming out on *Tuesday*,) may be repaid on *Wednesday* with $\frac{3}{4}$ or 75*l.* of the very Money he lent two days before.

Qu. 13. *Why is not our old worn unequal Money new Coined and equalized?*

Answ. There may be many weak Reasons for it; But the only good one which I know, is, that bad and unequal Money may prevent hoarding, whereas weighty, fine, and beautiful Money doth encourage it in some few timorous Persons, but not in the Body of Trading men. Upon the account of Beauty our *Britannia* Half pence¹ were almost all horded as Medals till they grew common; For if but 100 of those pieces had been Coined, they would, for their Work and Rarity, have been worth above 5s. each, which for their Matter are not worth that Half penny they pass for: For in them, *Materiam superabat Opus*.

Qu. 14. *Why hath Money been raised, or retrencht, or imbas'd by many wise States, and so often?*

Answ. When any State doth these things, they are like Bankrupt Merchants, who Compound for their Debts by paying 16s. 12s. or 10s. in the pound; Or forcing their Creditors to take off their Goods at much above the Market rates. And the same State might as well have paid but $\frac{3}{4}$ of what they ow'd, as to retrench their Money in General to $\frac{3}{4}$

¹ Leake says that the Britannia half-pence were coined of copper in 1665, "but were soon called in, to please a neighbouring monarch; they are therefore not very common." *English Money*, p. 371. But Ruding doubts whether any were milled before the end of 1672. *Annals*, II. 14—15.

of the known weight and fineness. And these practices have been compassed by Bankers and Cashiers, for oblique Considerations, from the Favourites of such Princes and States. ||

- (5) Qu. 15. *It is then the Honour of England that no such Tricks have been practiced, though in the greatest Streights that ever that State hath been in?*

Answ. It hath been their Wisdom, and consequently their Honour to keep up a Rule and Measure of trade amongst themselves, and with all Nations.

- Qu. 16. *But is there no Case wherein Money may be justly and honourably raised?*

Answ. Yes, in order to Regulation and Equalizing of Species of Coines; As when two Species of one Weight and Fineness are taken at different Rates, then the one may be raised or the other depressed: But this must be rated by the estimation of the whole World as near as it can be known, and not by any private Notion; and the like may be done between Gold and Silver¹.

- Qu. 17. *What do you think of the rising or falling of the Price of Lands, from this following Instance, viz. A piece of Land was sold 60 Years ago for 1000*l.* that is, for a 1000 Jacobusses; and the same Land is now sold for 1000*l.* or 1000 Guineas, and the Guinea is but $\frac{1}{8}$ the weight of the Jacobus. Is the Land cheaper now than 60 Years ago?*

Answ. It looks like a Demonstration that it is: Yet if Gold be not Money, but a Commodity next like to Money, and that Silver be only Money; then we must see whether 1000 *Jacobusses* would then purchase no more Silver than 1000 *Guineas* will do now: For if so, the Land was heretofore and now sold for the same Quantity of Money, though not of Gold; and is neither risen nor fallen by what hath been instanced.

- Qu. 18. *What is the difference between retrenching or raising of Money, and imbasing the Mettle of the same, as by mixing Copper with Silver?*

¹ Petty's opinion upon the point here involved has been diversely interpreted by Lord Liverpool, *Coins of the Realm* (1880), pp. 137—141 and by S. Dana Horton, *The Silver Pound*, 165—171.

Answ. The first is the better of the two, if such Mixture be of no use in other things: For if 20s. which contains 4 Ounces of Silver, should be reduced to 3 Ounces of Silver, it is better than to add one Ounce of Copper to the same, in order to make 4 seeming Ounces as before: For if you come to want the said 3 Ounces of Silver mixt with Copper, you must lose the Copper, upon the Test, and the Charge of Refining also, which will amount to above 4 *per cent.*

Qu. 19. *What do you object against small silver Money; as against Single Pence, Two Pences, &c.?*

Answ. That the Coinage of small Pieces would be very chargeable, and the Pieces themselves apt to be lost, and more liable to wearing; for little of our old small Money is now to be seen, and our Groats are worn away to Three half Pence in Metal. ||

Qu. 20. *What do you say of Money made wholly of base (6) Metal such as Farthings, &c.?*

Answ. That the want of Materials ought to be made up by the fineness of Coinage, to very near the intrinsick Value; or what is gained by the Want of either, to be part of the King's Revenue.

Qu. 21. *Which is best, Copper or Tin, for this purpose?*

Answ. Copper: Because it is capable of the most imitable and durable Coinage: though the Copper be Foreign, and Tin a Native Commodity. For suppose Copper and Tin of the same Value in *England*; yet if 100 Weight of Tin sent to *Turky* will fetch home as much Silk as will fetch above 100 of Copper from *Sweden*, in such Case the Difference between Native and Foreign is nothing.

Qu. 22. *This Doctrine may extend to a free exportation of Money and Bullion, which is against our Laws: Are our Laws, not good?*

Answ. Perhaps they are against the Laws of Nature, and also impracticable: For we see that the Countries which abound with Money and all other Commodities, have followed no such Laws: And contrarywise, that the Countries which have forbid these Exportations under the highest Penalties, are very destitute both of Money and Merchandize.

Qu. 23. *Is not a Country the Poorer for having less Money?*

Answ. Not always: For as the most thriving Men keep little or no Money by them, but turn and wind it into various Commodities to their great Profit, so may the whole Nation also; which is but many particular Men united.

Qu. 24. *May a Nation, suppose England, have too much Money?*

Answ. Yes: As a particular Merchant may have too much Money, I mean coined Money, by him.

Qu. 25. *Is there any way to know how much Money is sufficient for any Nation?*

Answ. I think it may pretty well be guessed at; *viz.* I think that so much Money as will pay half a Years Rent for all the Lands of *England*, and a Quarters Rent of the Houseing, and a Weeks Expence of all the People, and about a Quarter of the Value of all the exported Commodities, is sufficient for that purpose. Now when the States will cause these things to be computed, and the Quantity of their Coins to be known, which the new Coining of their old Money will best do, then it may also be known whether we have too much or too little Money.

Qu. 26. *What remedy is there if we have too little Money? ||*

(7) *Answ.* We must erect a Bank, which well computed, doth almost double the Effect of our coined Money: And we have in *England* Materials for a Bank which shall furnish Stock enough to drive the Trade of the whole Commercial World.

Quest. 27. *What if we have too much Coine?*

Answ. We may melt down the heaviest, and turn it into the Splendor of Plate, in Vessels or Utensils of Gold and Silver; or send it out, as a Commodity, where the same is wanting or desired; or let it out at Intrest, where Intrest is high.

Qu. 28. *What is Interest or Use-Money?*

Answ. A Reward for forbearing the use of your own Money for a Term of Time agreed upon, whatsoever need your self may have of it in the mean while.

Qu. 29. *What is Exchange?*

Answ. Local Interest, or a Reward given for having your Money at such a Place where you most need the use of it.

Qu. 30. *What is the Trade of a Banker?*

Answ. Buying and selling of Interest and Exchange: Who is honest only upon the Penalty of losing a beneficial Trade, founded upon a good Opinion of the World, which is called Credit.

Qu. 31. *You were speaking of base Money and Farthings, which are generally below the intrinsick Value, and therefore ought not to be permitted to increase ad infinitum. Is there any way to know how many were enough?*

Answ. I think there is: *viz.* Allowing about 12*d.* in Farthings, to every Family; So as if there be a Million of Families in *England* (as I think there be) then about 5000*l.* in Farthings would suffice for Change; and if such Farthings were but $\frac{1}{4}$ below the intrinsick Value, a Nation would pay but 1000*l.* for this Convenience: But if this way of Families be not Limitation enough, you may help it by considering the smallest Piece of Silver Money current in the Nation; which how much lesser it is, by so much lesser may the Number of Farthings be: The use of Farthings being but to make up Payments in Silver, and to adjust Accompts: To which end of adjusting Accompts let me add, that if your old defective Farthings were cryed down to five a penny, you may keep all Accompts in a way of Decimal Arithmetick, which hath been long desired for the ease and certainty of Accompts.

Qu. 32. *What do you think of our Laws for limiting Interest? ||*

Answ. The same as limiting the Exportation of Money; (8) \checkmark and there may be as well Laws for limiting Exchange also: For Interest always carrieth with it an Ensurance *praemium*, which is very casual, besides that of Forbearance: For Instance, in *Ireland* there was a time when Land (the highest Security) was sold for 2 Years Purchase: It was then naturally just to take 20, 30, or 40 *per Cent.* Interest; whereas there \checkmark the Law allows but 10. And since that time, Land being risen to 12 Years purchase, responsible Men will not give

above 8. And insolent¹ Men will offer *Cent. per Cent.* notwithstanding the Law. Again, suppose a Man hath 100*l.* of Land, worth 20 Years Purchase, and another 100*l.* in Houses, worth 12 Years Purchase; and an other 100*l.* in Shipping, worth 2 Years Purchase; and another in Horses, worth 6 Months Purchase; Is it not manifest he must have a greater Yearly *præmium* for lending his House than his Land, his Ship than his House, and his Horse than his Ship? For if his Horse be worth 100*l.* he cannot hire him out for less than 10*s.* *per diem*, whereas the Land will not yield a Groat for the same time; and these Hires are the same with Intrest.

Price 2*d.*²

LONDON, Printed in the Year, 1695.

¹ The reprint in Somers' Tracts has 'insolvent.'

² The Brit. Mus. copies 8223a.69 and 104f.61 have not 'Price 2*d.*'

SEVERAL
ESSAYS
IN
Political
Arithmetick:

The Titles of which follow in the
Ensuing Pages.

BY
Sir *WILLIAM PETTY*,
Late Fellow of the *Royal Society*.

L O N D O N :
Printed for *Robert Clavel* at the *Peacock*,
and *Henry Mortlock* at the *Phoenix* in *St. Paul's*
Church-Yard. 1699.

NOTE ON THE ESSAYS IN "POLITICAL ARITHMETICK."

✓ THE Essays in Political Arithmetick, belong, in large part, to the fourth period of Petty's literary activity, and most, though not all of them were written in London. The circumstances which led to the writing of the various essays are indicated, so far as known, in connection with each essay severally. Petty never grouped the series, and it is uncertain who edited the collection published in 1699¹. The order then adopted was chronological by date of publication, and it has been here adhered to save as regards the Political Arithmetick. That book, because first published (as supposed) in 1691, was made to follow the Five Essays, though it has little direct connection with them. I have transposed it to the first volume, a position which indicates more correctly its true chronological place among Petty's writings. The Essays thus follow Graunt's Observations, to which in subject and treatment they are more closely related than to Petty's other writings, and also precede the Treatise of Ireland, with which their chronological connection is most intimate.

The Essays were chiefly written in Petty's last years, when his health was much impaired², and were almost immediately put to press. No necessity for circulating them in MS. arose and no MSS. of them are known. They are here reprinted not from the posthumous collected edition of 1699, but from the several original editions, the proof of nearly all of which doubtless passed under Petty's eye.

¹ Meitzen suggests that the editor was "John Williamson" (probably Sir Joseph is intended), but the suggestion seems to rest solely upon a misreading of Anthony à-Wood. *Geschichte der Statistik*, 15. Thorpe's *Cat. lib. MSS. bibl. Southwelliana*, lot 710, describes a draft of a letter, dated 26 Dec., 1698, from Sir Robert Southwell to Petty's son Henry, afterwards Baron Shelburne, "relative to Sir William Petty's papers, some of which were then reprinting."

² Fitzmaurice, 289 seq.

ANOTHER
ESSAY
IN
Political Arithmetick,
Concerning the Growth of the
CITY
OF
LONDON:
WITH THE
Measures, Periods, Causes,
and Consequences there-
of. 1682.

By Sir *William Petty*, Fellow of the
ROYAL SOCIETY.

LONDON:

Printed by *H. H.* for *Mark Pardoe*, at the *Black
Raven*, over against *Bedford-House*, in the Strand. 1683.

NOTE ON "ANOTHER ESSAY IN POLITICAL
ARITHMETIC."

ANOTHER Essay in Political Arithmetick was probably written in
✓ Ireland about 1681¹, but was not sent to press until after Petty came
to London in June, 1682². Three years after the first edition, which
is dated 1683, there appeared, under a changed title³, a "second
edition, revised and enlarged." The revision extends only to a few
verbal changes which are recorded in the footnotes of this reprint.
The enlargement was affected by the addition of the stationer's
address to the reader and the "extract of a letter" which are re-
printed on pages 453 to 455. Aside from these pages the ensuing
text conforms to that of the original edition issued in 1683. The
Essay is reviewed in the *Journal des Sçavans*, 15 Mars, 1683.

¹ See p. 466 and note, also p. 468.

² Cf. pp. 438, 480.

³ See Bibliography 13, 17.

THE
STATIONER
To the READER.

The ensuing Essay concerning the Growth of the City of London was entituled [Another Essay]¹ intimating that some other Essay had preceded it, which was not to be found. I having been much importuned for that precedent Essay², have found that the same was about the Growth, Encrease, and Multiplication of Mankind, which Subject should in Order of Nature precede that of the Growth of the City of London, but am not able to procure the Essay itself, onely I have obtained from a Gentleman³, who sometimes corresponded with Sir W. Petty, an Extract of a Letter from Sir William to him, which I verily believe containeth the scope thereof; wherefore, I must desire the Reader to be content therewith, till more can be had.

¹ In the first edition.

² "Only a sort of syllabus of it [pp. 454, 455] remains." Fitzmaurice, 216.

³ Probably Sir Robert Southwell, through whom Petty had other dealings with Mark Pardoe, the stationer.

The Extract of a Letter concerning the scope of an Essay intended to precede Another Essay concerning the Growth of the City of (LONDON), &c. An Essay in Political Arithmetick, concerning the Value and Encrease of People and Colonies.

THE scope of this *Essay*, is concerning People and Colonies, and to make way for *Another Essay* concerning the *Growth* of the *City of London*. I desire in this first *Essay* to give the World some light concerning the Numbers of People in *England*, with *Wales*, and in *Ireland*; as also, of the || number of Houses, and Families, wherein they live, and of Acres they occupy.

2. How many live upon their *Lands*, how many upon their *Personal Estates*, and *Comerce*, and how many upon *Art*, and *Labour*; how many upon *Alms*, how many upon *Offices* and *Publick Employments*, and how many as *Cheats* and *Thieves*; how many are *Impotents*, *Children*, and *decrepit Old men*.

3. How many upon the *Poll-Taxes* in *England*, do pay extraordinary Rates, and how many at the Level¹.

4. How many Men and Women are *Prolifick*, and how many of each are Married or Unmarried.

5. What the Value of People² are in *England*, and what

¹ See *Treatise of Taxes*, p. 62, note.

² Petty reckons the "value of people" variously at more than £60, *Two Essays*, post, at £69, *Verbum Sap.*, p. 108, at £70, *Polit. Anatomy*, p. 152, *Treatise of Ireland*, post, and this *Essay*, p. 476, and at £80, *Polit. Arith.*, p. 267.

in *Ireland* at a *Medium*, both as Members of the *Church* or *Commonwealth*, or as *Slaves* and Servants to one another; with a || Method how to estimate the same, in any other *Country* or *Colony*.

6. How to compute the Value of Land in *Colonies*, in comparison to *England* and *Ireland*.

7 How 10 thousand People in a *Colony* may be, and planted to the best advantage.

8. A Conjecture in what number of years *England* and *Ireland* may be fully peopled, as also all *America*, and lastly the whole habitable Earth.

9. What spot of the *Earths-Globe* were fittest for a general and universal *Emporium*, whereby all the people thereof may best enjoy one anothers *Labours* and *Commodities*.

10. Whether the speedy Peopling of the Earth would make

1. For the good of Mankind.
2. To fulfil the revealed *Will* of *God*.
3. To what *Prince* or *State* the same would be most advantageous. ||

11. An exhortation to all thinking Men to salve the Scriptures and other good Histories, concerning the *Number* of *People* in all *Ages* of the *World*, in the great *Cities* thereof, and elsewhere.

12. An Appendix concerning the different Number of *Sea-fish* and *Wild-fowl*, at the end of every thousand years, since *Noah's* Flood.

13. An *Hypothesis* of the use of those spaces (of about 8,000 miles through) within the *Globe* of our *Earth*, supposing a shell of 150 miles thick.

14. What may be the meaning of *Glorified Bodies*, in case the place of the Blessed shall be without the Convex of the Orb of the *fixed Stars*, if that the whole System of the *World* was made for the use of our *Earths-men*. ||

3 The Principal Points of this
 Discourse.

1. **T**HAT London doubles in Forty Years, and all England in Three hundred and sixty Years.
2. That there be, Anno 1682. about Six hundred and seventy Thousand Souls in London, and about seven Millions four hundred Thousand in all England and Wales, and about twenty-eight Millions of Acres of Land¹.
3. That the Periods of doubling the People, are found to be in all Degrees, from between Ten, to Twelve hundred Years.
4. That the Growth of London must stop of its self, before the Year 1800.
5. A Table helping to understand the Scriptures, concerning the Number of People mentioned in them. ||
- 4 6. That the World will be fully Peopled within the next Two Thousand Years.
7. Twelve Touch-stones², whereby to Try any Proposal, pretended for the Publick Good.
8. How the City of London may be made (Morally speaking) Invincible.
9. An Help to Uniformity in Religion.
10. That 'tis possible to increase Mankind by Generation four times more than at present.
11. The Plagues of London is the Chief Impediment and Objection against the Growth of the City.
12. That an Exact Account of the People is Necessary in this Matter. ||

¹ 2d ed., 'Acres of Profitable Land.'

² 2d ed., 'Twelve ways.'

Of the Growth of the CITY of LONDON: 5
And of the Measures, Periods, Causes,
and Consequences thereof.

BY the City of *London*, we mean the Housing within the Walls of the Old City, with the Liberties thereof, *Westminster*, the *Borough of Southwark*, and so much of the built Ground in *Middlesex* and *Surrey*, whose Houses are contiguous unto, or within Call of those afore-mentioned. Or else we mean the Housing which stand upon the Ninety seven Parishes within the Walls of *London*; upon the Sixteen Parishes next, without them; the Ten Parishes of *Westminster*, and the Seven Parishes || without them all; all which One hundred and thirty Parishes¹ are comprehended within the Weekly *Bills of Mortality*².

What is meant by *London*.

The Growth of this City is Measured, 1. By the Quantity of Ground, or Number of Acres upon which it stands. 2. By the Number of Houses, as the same appears by the *Hearth-Books* and late *Maps*. 3. By the Cubical Content of the said Housing.

What is meant by the Growth of *London*.

¹ 2d ed., 'The six parishes of Westminster, and the fourteen out parishes in Middlesex and Surrey, contiguous to the former; all which one hundred and thirty-three parishes.'

² Petty's arrangement of ninety-seven parishes within the walls, sixteen next without, ten in Westminster, and seven without them all, is a division unknown to the bills. It probably arose from a transposition of the figures for Westminster (seven parishes) and for the parishes without them all (ten) given by Graunt. In the first edition Petty cites bills for 1665—1682, during which years the division was in fact 97, 16, 12, and 5 parishes in 1665—1670 and 97, 16, 14, and 5 parishes in 1674—1682. In the second edition, published in 1686, Petty corrected the division of the parishes (see preceding note) to correspond not to his table, which still stopped with 1682, but to the last yearly bill published when he wrote, (the bill for 1685), which included 97, 16, 14 and 6 parishes. On these changes see the Introduction.

4. By the Flooring of the same. 5. By the Number of Days-work, or Charge of Building the said Houses. 6. By the Value of the said Houses, according to their Yearly Rent, and Number of Years Purchase. 7. By the Number of Inhabitants; according to which latter sense only, we make our Computations in this Essay.

Till a better Rule can be obtained, we conceive that the 7 Proportion || of the People may be sufficiently Measured by the Proportion of the *Burials* in such Years as were neither remarkable for extraordinary Healthfulness or Sickliness.

That the City hath Increased in this latter sense, appears from the Bills of *Mortality*, represented in the two following Tables, *viz.* One whereof is a continuation for Eighteen years, ending 1682, of that Table which was Published in the 117th. *pag.* of the Book of the Observations upon the *London Bills of Mortality*, Printed in the Year 1676. The other sheweth what Number of People dyed at a *Medium* of two Years, indifferently taken, at about Twenty Years distance from each other. ||

In what
Measures
the City
hath In-
creased.

8

The first of the said two Tables.

An. Dom.	97 Parishes.	16 Parishes.	Out Parishes.	Buried in all.	Besides of the Plague.	Christened.
1665	5320	12463	10925	28708	68596	9967
1666	1689	3969	5082	10740	1998	8997
1667	7761 ¹	6405	8641	15807	35	10938
1668	796	6865	9603	17267	14	11633
1669	1323	7500	10440	19263	3	12335
1670	1890	7808	10500	20198		11997
1671	1723	5938	8063	15724	5	12510
1672	2237	6788	9200	18225	5	12593
1673	2307	6302	8890	17499	5	11895
1674	2801	7522	10875	21198	3	11851
1675	2555	5986	8702	17243	1	11775
1676	2756	6508	9466	18730	2	12399
1677	2817	6632	9616	19065	2	12626
1678	3060	6705	10908	20673	5	12601
1679	3074	7481	11173	21728	2	12288
1680	3076	7066	10911	21053		12747
1681	3669	8136	12166	23971		13355
1682	2975	7009	10707	20691		12653

¹ 7761 is a misprint for 761, which is the reading of the second edition and corresponds to the footing.

According to which latter Table, there dyed as followeth. ||

The latter of the said two Tables.

9

There dyed in *London*, At a *Medium* between the Years.

1604 and 1605	5135. A. ¹
1621 and 1622	8527. B.
1641 and 1642	11883. C.
1661 and 1662	15148. D.
1681 and 1682	22331. E.

Wherein Observe, That the Number C. is double to A. and 806 over. That D. is double to B.² within 1906. That C. and D. is double to A. B. within 293. That E. is double to C. within 1435. That D. and E. is double to B. and C. within 3341. And that C. and D. and E. are double to A. and B. and C. within 1736³. And that E. is above Quadruple to A. All which differences (every way considered) do allow the doubling of the People of *London* in forty Years, to be a sufficient estimate thereof in round || Numbers, and without ¹⁰ the trouble of Fractions. We also say, That 669930 is near the Number of People now in *London*, because the Burials are 22331. which Multiplied by 30, (one dying Yearly out of 30, as appears in the 94 *pag.* of the afore-mentioned Observations⁴) maketh the said Number; and because there are 84 Thousand Tenanted Houses (as we are Credibly Informed⁵) which, at 8 in each, makes 672 Thousand Souls; the said two Accounts differing inconsiderably from each other.

¹ The numbers A, B, C, and D are calculated from Graunt's table, pp. 407—409. The number A, 5135, is miscalculated or misprinted; it should be 5185. The error makes, on the whole rather for than against Petty's contention.

² In figuring that one number "is double to" another within a certain sum, Petty uses, in every case but the first, a process indicated by the formula $x = 2y \pm n$. But in order to get the result that "C is double to A and 806 over" one must use the formula $\frac{x}{2} = y \pm n$. Had Petty calculated the relation of C to A as he does the relation of D to B, etc., the surplus would have been 1613, his erroneous valuation of A being accepted.

³ '1736' should be '1738.'

⁴ On the page cited (p. 393 of this edition) Graunt says that "about one in 32 dies." But in the Index (p. 332) is the statement, with reference to page 93, that "at London one of thirty" dies yearly.

⁵ Probably by the makers of Ogilby and Morgan's map; cf. a note to *Five Essays* below.

We have thus pretty well found out in what Number of Years (*viz.* in about 40,) that the City of *London* hath doubled, and the present Number of *Inhabitants* to be about 670 Thousand. We must now also endeavour the same for the whole *Territory of England* and *Wales*. In Order whereunto, we ||

The People of *London* are about the
 11 Eleventh part of all *England* and *Wales*.

First say, That the Assessment of *London* is about an Eleventh part of the whole Territory¹, and therefore, that the People of the whole may well be Eleven times that of *London*, *viz.* about 7 Millions, 369 Thousand Souls; with which Account that of the *Poll-money*, *Hearth-money*², and the Bishops late Numbring of the *Communicants*³, do pretty well agree; wherefore, although the said Number of 7 Millions, 369 Thousand, be not (as it cannot be) a *demonstrated Truth*, yet it will serve for a good *Supposition*, which is as much as we want at present.

The people of *England* about 7 Millions and 400 thousand.

As for the time in which the People double, it is yet

¹ By 31 Charles II., c. 1. (1679), the last assessment before Petty wrote, *London* paid £2145 15s. 8d., *Middlesex*, including *Westminster*, £1520 5s., *Surrey*, including *Southwark* £798 10s. 1d., in all £4464 10s. 9d. or a little more than one eighth the monthly assessment of £34410 9s. 6d. But the proportion of *London* proper, which was the basis of Petty's earlier calculation (*Verbum Sap.*, p. 107, note) now fell to less than one sixteenth. On the proportion of *London* in different assessments see Thorold Rogers, *Economic Interpretation of History*, 145—156.

² The hearth money was imposed by 14 Charles II. c. 10. By 15 Charles II. c. 13 it was enacted that whereas the revenue from hearth money had "beene much obstructed for want of true and just Accompts under the hands of the respective Occupiers of Houses Edifices Lodgings and Chambers as by the said Act is required," therefore the account should be verified upon visitation by the constable. He should make out "a Booke or Roll fairely written wherein shall be Two Columnes, The one containing the Names of the persons and the number of Hearthes and Stoves in their respective Possessions that are chargeable by the said Act, and the other the Names of the persons...not chargeable." This roll was to be transmitted to the high constable, then to the Justices of the peace, then to the Clerk of the peace, who should "within Two Moneths engrosse in Parchment a true Duplicate of the said Booke or Roll, which being signed by him, and by two Justices of the Peace at least of the respective County and places aforesaid shall be transmitted within one Moneth after such Engrossment into his Majestie's Courts of Exchequer."

³ In *Stowe MS.* 322 at the British Museum, ff. 89—90, is contained the following memorandum :

more hard to be found : For we have good Experience (in the said 94 *pag.* of the afore-mentioned Observations) That || in the Country, but one of fifty dye *per Annum*; and by 12 other late Accounts, that there have been sometimes but 24 *Births* for 23 *Burials*, The which two points, if they were universally, and constantly true, there would be colour enough

The Telling of Noses; Or The Number of Freeholders in England according to S^r W. P.

	Conformists	Nonconf.	Papists
In the Province of {	Cant. 2123362	93151	11878
York	353892	15525	1978
In both	2477254	108676	13858
Conf.	2477254		
Nonconf.	108676		
Together	2585930		
Papists	13856		
In all Engl	2599786		

According to wth Account the proportion of
 Conformists to Nonconformists, is 22 $\frac{1}{2}$
 Conformists to Papists, is 178 $\frac{1}{8}$
 Conf. & Nonconf. together, to Papists, is 186 $\frac{3}{4}$ } to One.

[Endorsed]. Calculation of the People of England. 1687.

The MS. in the hand of a copyist, who has unquestionably misdated it, was formerly at Ashburnham Place. *Eighth Report Hist. MSS. Com.*, App. III. p. 12. The same calculation, but at much greater length, is assigned by Sir John Dalrymple's *Memoirs of Great Britain and Ireland*, 2d ed., appendix, pt. II. pp. 11—15, to the reign of William III. The origin of the figures is revealed by Petty's friend, Sir Peter Pett. Pett discusses "the Result of the Bishops Survey, which was made of the Province for Canterbury. and wherein none under the age of Communicants or 16 were return'd, and but very few Servants, or Sons, and Daughters, or Lodgers, or Inmates of the people of several perswasions of Religion: and the thing endeavour'd was that the heads of Families or House-Keepers, i.e. Man and Wife might be truly return'd: and at that rate, the Total at the foot of the account for the Province of Canterbury is 2,228,386, the which according to the forementioned currant Rule of Calculation to be necessarily about doubled on account of the people under 16, makes the Total of the Souls in that Province to be 4 Millions 4 Hundred 56 thousand, 7 hundred seventy two; and the Province of York bearing a sixth part of the Taxes, and having therefore the 6th. part of the people, that the Province of Canterbury hath, which is 742,795, that being added to those of Canterbury, makes 5 Millions, a hundred ninety nine thousand, five hundred sixty seven." *Happy future State of England*, 117—118. Writing in 1680, although his book was not published until 1688, Pett goes on to say that this enumeration was taken in 1676, that it was defective, and that the total population of England was, at the time when he wrote, more than five million two hundred thousand.

to say, that the People doubled but in about 1200 Years. As for Example: Suppose there be 600 people, of which let a fiftieth part dye *per Annum*, then there shall dye 12 *per Annum*; and if the Births be as 24 to 23, then the Increase of the People shall be somewhat above half a Man *per Annum*, and consequently the supposed Number of 600, cannot be doubled but in 1126 Years, which to reckon in round Numbers, and for that the afore-mentioned Fractions were not exact, we had rather call 1200.

There are also other good *Observations*, That even in the
 13 Country, one in about 30, or 32 *per Annum* || hath dyed, and that there have been five *Births* for four *Burials*¹. Now, according to this Doctrine, 20 will dye *per Annum* out of the above 600, and 25 will be Born, so as the *Increase* will be 5, which is a hundred and twentieth part of the said 600. So as we have two fair *Computations*, differing from each other as one to ten; and there are also several other good *Observations* for other *Measures*.

I might here Insert, That although the Births in this last Computation be 25 of 600, or a Twenty fourth part of the People; yet that in Natural possibility, they may be near thrice as many, and near 75. For that by some late *Observations*, the *Teeming* Females between 15 and 44, are about 180 of the said 600, and the *Males* of between 18 and 59, are about 180 also, and that every *Teeming Woman* can bear a
 14 *Child* || once in two Years; from all which it is plain, that the *Births* may be 90. (and abating 15 for *Sickness*, *Young Abortions*, and *Natural Barrenness*) there may remain 75 Births, which is an Eighth of the People; which by some *Observations* we have found to be but a *two and thirtieth part*, or but a *quarter* of what is thus shewn to be Naturally possible. Now, according to this Reckoning, if the *Births* may be 75 of 600, and the *Burials* but 15, then the *Annual Increase* of the People will be 60; and so the said 600 People may double in 10 Years, which differs yet more from 1200 above-mentioned. Now, to get out of this Difficulty, and to temper those vast disagreements, I took the *Medium* of 50

¹ Graunt, p. 390.

and 30 dying *per Annum*, and pitch'd upon 40; and I also took the *Medium* between 24 *Births* and 23 *Burials*, and 5 *Births* for 4 *Bu-rials*, *viz.* allowing about 10 *Births* for 9 ¹⁵ *Burials*; upon which Supposition, there must dye 15 *per Annum* out of the above-mentioned 600, and the *Births* must be 16 and two *Thirds*, and the Increase 1, and two *Thirds*, or five *Thirds* of a Man, which Number compared with 1800 *Thirds*, or 600 Men, gives 360 Years for the time of doubling (including some Allowance for *Wars*, *Plagues*, and *Famine*, the Effects thereof, though they be *Terrible* at the Times and Places where they happen, yet in a period of 360 Years, is no great Matter in the whole Nation. For the *Plagues* of *England* in 20 Years hath carried away scarce an Eightieth part of the People of the whole Nation; and the late 10 Years *Civil Wars*, (the like whereof hath not been in several Ages before) did not take away || above a fortieth part of the ¹⁶ whole people.)

That the time of doubling is here and now 360 Years.

According to which Account or Measure of doubling, if there be now in *England* and *Wales*, 7 Millions 400 Thousand People, there were about 5 Millions 526 Thousand in the beginning of Queen *Elizabeths* Reign, *Anno* 1560. and about two Millions at the *Norman Conquest*, of which Consult the *Dooms-day Book*, and my Lord *Hale's Origination of Mankind*¹.

Memorandum, That if the People double in 360 Years, that the present 320 Millions computed by some Learned Men, (from the Measures of all the Nations of the World, their degrees of being Peopled, and ^{320 Millions now in the World.}

¹ Petty's allusion to *Domesday Book* rests, probably, upon such knowledge only as he drew from reading Sir Matthew Hale's *The primitive Origination of Mankind considered and examined*, (1672). Hale, however, does not estimate the population of England at the time of the Conquest at all. That, he thinks, would be "a labourious piece of work, but it is not difficult to be done in any one County; I have tried the comparison in the County of Gloucester...and I do find...that the number of inhabitants now are above twenty times more than they were at that time," p. 235. The laborious piece of work has since been performed by Sir Henry Ellis, but the "recorded population" (287,045) must be multiplied "by four, five or six, according to knowledge or taste, before the population of England will be attained."—Maitland, *Domesday Book and beyond*, 408; cf. pp. 17—22, 400, 437, also Pell in *Domesday Studies*, 1. 561.

good Accounts of the people in several of them) to be now upon the Face of the Earth¹, will within the next 2000 Years
 17 so increase as to give one || Head for every two Acres of Land in the *Habitable* part of the *Earth*. And then, according to the *Prediction* of the *Scriptures*, there must be *Wars* and great *Slaughter*, &c.

Wherefore, as an *Expedient* against the above-mentioned difference between 10 and 1200 Years, we do for the present, and in this Countrey admit of 360 Years to be the time wherein the People of *England* do double, according to the present *Laws* and *Practice of Marriages*.

Now, if the City double its People in 40 Years, and the present Number be 670 Thousand, and if the *whole Territory* be 7 Millions 400 Thousand, and double in 360 Years, as aforesaid; then by the underwritten Table it appears, that *Anno* 1840, the People of the City will be 10718880, and those of the whole Country but 10917389, which is but
 18 inconsiderably more. Where-||fore it is Certain and Necessary that the *Growth* of the City must stop before the said Year 1840: And will be at its utmost height in the next preceding Period, *Anno* 1800, when the Number of the City will be Eight times its present Number, *viz.* 5 Millions 359 Thousand. And when (besides the said Number) there will be 4 Millions 466 Thousand to perform the *Tillage*, *Pasturage*, and other Rural Works Necessary to be done without the said City, as by the following Table, *viz.*

	{ <i>Annis.</i> }	{ Burials }	{ People in <i>London.</i> }	{ People in <i>England.</i> }
	1565	2568	77040	5526929
As in the former Table.	1605	5135		
	1642	11883		
	1682	22331	669930	7369230
	1722	44662		
	1762	89324		
	1802	178648	5359440	9825650
	1842	357296	10718880	10917389

¹ Petty's learned men have not been identified. In 1685 Isaac Vossius estimated the population of the world at 500 millions, a number which Bayle ridiculed as too large: *Vossii variarum observationum liber*, 68; Bayle, *Nouvelles*

Now, when the People of *London* shall come to be so ¹⁹ near the *People* of all *England*, Then it follows, That the *Growth* of *London* must stop before the said Year 1842, as aforesaid, and must be at its greatest height *Anno* 1800, when it will be eight times more than now, with above four Millions for the Service of the *Country* and Ports, as aforesaid.

That *London* will be at its highest growth, and eight times as great as now, *Anno* 1800.

Of the afore-mentioned vast difference between ¹⁰ 10 Years and 1200 Years for *doubling* the People, we make this use, *viz.* To justify the *Scriptures* and all other good *Histories* concerning the *Number* of the People in Ancient Time. For supposing the eight *Persons* who came out of the *Ark*, *Increased* by a Progressive doubling in every 10 Years, might grow in the || first 100 Years after the *Flood* from 8 to 8000, ²⁰ and that in 350 Years after the *Flood* (when abouts *Noah* dyed) to one Million, and by this time 1682, to 320 Millions (which by rational conjecture, are thought to be now in the World) it will not be hard to compute, how in the intermediate Years, the *Growths* may be made, according to what is set down in the following *Table*, wherein making the doubling to be 10 Years at first, and within 1200 Years at last, we take a discretionary liberty, but justifiable by Observations and the *Scriptures* for the rest, which *Table* we leave to be Corrected by *Historians*, who know the bigness of *Ancient Cities*, *Armies*, and *Colonies* in the respective *Ages* of the *World*, in the meantime affirming that without such difference in the *Measures* and Periods for doubling (the extreams whereof we have demonstra-||ted to be real and true) it is ²¹ impossible to solve what is written in the Holy *Scriptures* and other *Authentick Books*. For if we pitch upon any one Number throughout for this purpose, 150 Years is the fittest of all round Numbers; according to which, there would have been but 512 Souls in the whole World in *Moses's* time (being

A digression of the use of the vast difference between 10 and 1200 Years of doubling.

de la République des Lettres, Janvier, 1685, *Oeuvres*, I. 212—214. See the chapter on the "Historische Entwicklung der Versuche, die Gesamtbevölkerung der Erde zu schätzen," in Behm and Wagner, *Die Bevölkerung der Erde*, II. 3—8, Petermann's *Geogr. Mittheilungen*, Ergänzungsband, VIII. nr. 35.

800 Years after the Flood) when 603 Thousand *Israelites* of above 20 Years Old (besides those of other Ages, Tribes, and Nations) were found upon an exact Survey appointed by God¹, Whereas our Table makes 12 Millions. And there would have been but 8000 in *David's* Time, when were found 1100 Thousand of above 20 Years Old (besides others, as aforesaid) in *Israel*, upon the Survey instigated by Satan², whereas our Table makes 32 Millions. And there would²³ have been but a quarter of a || Million about the Birth of Christ, or *Augustus* his Time, when *Rome* and the *Roman* Empire were so great, whereas our Table makes 100 Millions. Where Note, That the *Israelites* in about 500 Years between their coming out of *Egypt* to *David's* Reign, increased from 603 Thousand to 1100 Thousand.

On the other hand, if we pitch upon a less Number, as 100 Years, the World would have been over-peopled 700 Years since. Wherefore, no one Number will solve the *Phænomena*, and therefore we have supposed several in Order to make the following Table, which we again desire Historians to Correct, according to what they find in Antiquity concerning the Number of the People in each Age and Countrey of the World.

We did (not long since) assist a worthy Divine³, writing²³ against some || *Scepticks*, who would have baffled our belief of the Resurrection, by saying, that the whole Globe of the

¹ Numbers i. 1—46. The precise number is 603,550. Petty has overlooked the later enumeration of 601,730, Numbers xxvi. 1—51.

² 1 Chronicles xxi. 1—8, 'and all Israel were a thousand thousand and a hundred thousand men that drew the sword; and Judah four hundred three score and ten thousand men that drew the sword.' The account in 2 Samuel xxiv. 1—9 gives 800000 fighting men in Israel and 500000 in Judah.

³ Concerning his assistance to the worthy divine, Petty writes thus to Sir Robert Southwell:

Dublin 20th Aug^t. 1681.

Dear Cosen,

Once more pay the Postage of 4 Sheets. By ye last you saw ye Quantum of my Damage; by this you shall ye Quomodo, & consequently ye Injury. Oh! that I could get some body to read my Papers.

There is a good man about this Town writing ag^t Atheisme, and in particular at this time answering their Cavills against ye Resurrection; Which are, That ye whole Globe of ye Earth will not afford sufficient Matter to the Bodies that must

Earth could not furnish Matter enough for all the Bodies that must Rise at the last Day, much less would the surface of the Earth furnish footing for so vast a Number; whereas we did (by the Method afore-mentioned) assert the Number of Men now living, and also of those that had dyed since the beginning of the World, and did withal shew, that half the

Rise, much less will the surface thereof (say they) afford footing to all those Bodies. Now ye assistances which I have given this good man are viz.

1^o Supposing ye People in England, Scotland & Ireland to be ab^t nine Millions, Those in Holland and Zealand ab^t one Million, and in France 16, I say that by comparing ye rest of ye World therewth there are but between 300 & 400 Millions of Souls now living.

2^o Upon this and Grant's Measures I ascertain ye Number that ever have died since ye Creation, & find that Munster would afford them all Graves, and ye Mangerton Bodies, or ye Equivalent in weight of Earth.

Having thus help'd my Friend, I took occasion to proceed, viz.

1st I find yt ye World being 5630 years old [Scaliger's Chronology, cf. p. 388, note 1], and Adam & Eve doubling but every 200 years (as Grant also saies) there must be now 316 Millions of People upon ye Earth; w^{ch} answers admirably, and is a brave Argument agst Scripture-Scoffers and Præ-Adamites.

Nevertheless upon Examination of our Friend Grant's Positions,

2^{dly} I find People do double very differently in every Century of ye World, and have (as I think) rectified his Doctrine, by making many Numbers in continuall Proportion.

3^{dly} I further find, that ye World at a Medium is at this day not much better peopled then our wretched Baronies in Keery, nor above $\frac{1}{7}$ part so well as our poor Ireland is; nor above $\frac{1}{10}$ part so well as Holland, w^{ch} is over-peopled.

4^{thly} I find yt in ye next 1400 years ye World doubling it's People in my corrected proportion, must be over-peopl'd, and then that there must be great Wars and Slaughters, and yt ye Strong must then destroy ye Weak, or ye World must (of necessity) come to an end.

5^{thly} I find by looking far back upon ye paucity of People in ye Asyrian, Persian, and other first Monarchies, how easy a thing 'twas for a few resolute Fellows to conquer ye World, as then it was. And that (whatever ye King of France may think) ye Universall or Great Monarchy does and will grow every Century more & more difficult by ye Course of Nature.

6^{thly} I conclude, that as People double faster now then they did in former Ages, so ye Rents of Lands must also rise proportionably, and ye number of years Purchase also: Wherefore let us get possession of what ye Affidavit saies is kept from us.

Thus, Dear Cosen (having ended where I began) I am still Yours.

[Endorsement] Dublin, Aug^t. 20th. 1681. A Copy of Sr. Wm. Petty's Letter to Sr. Rob^t. Southwell. Ab^t. ye Number of Mortals, &c.

Rawlinson MS. A. 178, ff. 71—72, Bodleian Library; among the Pepys papers. The letter has been printed in Rev. John Smith's *Life, Journals, and Correspondence of Pepys* (1844), II. 317.

Island of *Ireland* would afford them all, not only Footing to stand upon, but Graves to lye down in, for that whole Number; and that two Mountains in that Countrey were as weighty as all the Bodies that had ever been from the beginning of the World to the Year 1680, when this Dispute happened. For which purpose I have digressed from my ²⁴ intended purpose, to insert || this *Matter*, intending to prosecute this hint further, upon some more proper Occasion.

A Table showing how the People might have doubled in the several Ages of the World.

<i>Anno after the Flood.</i>		
Periods of doubling	{ 1	8 persons.
	{ 10	16
	{ 20	32
	{ 30	64
	{ 40	128
In 10 Years	{ 50	256
	{ 60	512
	{ 70	1024
	{ 80	2048
	{ 90	4096
	{ 100	8000 and more.
In 20 Years	{ 120 Years after the Flood.	16 Thousand.
	{ 140	32
	{ 170	64
30	{ 200	128
40	{ 240	256
50	{ 290	512
60	{ 350	1 Million and more.
70	{ 420	2 Millions.
100	{ 520	4 Millions.
190	{ 710	8 Millions.
290	{ 1000	16 In Moses Time.
400	{ 1400	32 About Davids Time.
550	{ 1950	64
750	{ 2700	128 About the Birth of Christ.
1000	{ 3700	256
In 300	{	
1200	{ 4000	320

It is here to be Noted, That in this Table we have assigned ²⁵ a different Number of Years for the time of doubling the People in the several Ages of the *World*, and might have done the same for the several *Countries* of the *World*, and therefore the said several *Periods* assigned to the *whole World* in the *Lump*, may well enough consist with the 360 Years especially assigned to *England*, between this Day, and the *Norman Conquest*; And the said 360 Years may well enough serve for a Supposition between this time, and that of the *Worlds* being fully Peopled; Nor do we lay any stress upon one or the other in this disquisition concerning the *Growth* of the City of *London*.

We have spoken of the Growth of *London*, with the Measures and Periods thereof, we come next to the Causes and Consequences of the same. ||

The Causes of its *Growth* from 1642 to 1682, may be said ²⁶ to have been as followeth, *viz.* From 1642 to 1650, That Men came out of the *Country* to *London*, to shelter themselves from the Outrages of the *Civil Wars*, during that time; from 1650 to 1660, The *Royal Party* came to *London*, for their more private and inexpensive Living; from 1660 to 1670, the *Kings Friends* and *Party* came to receive his *Favours* after his *Happy Restauration*; from 1670 to 1680, The frequency of *Plots* and *Parliaments* might bring extraordinary Numbers to the City; But what Reasons to assign for the like *Increase* from 1604 to 1642, I know not, unless I should pick out some *Remarkable Accident* happening in each part of the said *Period*, and make that to be the Cause of this *Increase* (as *Vulgar People* make the Cause of every Mans Sickness to be || what he did last eat) wherefore, rather than so to ²⁷ say *quidlibet de quolibet*; I had rather quit even what I have above-said to be the Cause of *London's Increase* from 1642 to 1682, and put the whole upon some Natural and Spontaneous *Benefits* and *Advantages* that Men find by Living in great more than in small *Societies*; and shall therefore seek for the *Antecedent Causes* of this *Growth*, in the *Consequences* of the like, considered in greater *Characters* and *Proportions*.

Now, whereas in Arithmetick, out of two false *Positions* the Truth is extracted, so I hope out of two *extravagant* contrary Suppositions, to draw forth some solid and consistent *Conclusion, viz.*

The first of the said two Suppositions is, That the City of *London* is seven times bigger than now, and that the
 28 *Inhabitants* of it are four || Millions 690 Thousand People, and that in all the other *Cities, Ports, Towns, and Villages*, there are but two Millions 710 Thousand more.

The other *Supposition* is, That the City of *London* is but a seventh part of its present bigness, and that the *Inhabitants* of it are but 96 Thousand, and that the rest of the *Inhabitants* (being 7 Millions 304 Thousand) do Co-habit thus, 104 Thousand of them in small *Cities* and *Towns*, and that the rest, being seven Millions 200 Thousand, do Inhabit in *Houses* not contiguous to one another, *viz.* in 1200 Thousand Houses, having about 24 Acres of Ground belonging to each of them, accounting about 28 Millions of Acres to be in the whole *Territory of England, Wales, and the adjacent Islands*; which any Man that pleases may Examine upon a good Map. ||

29 Now, the Question is, In which of these two Imaginary states, would be the most convenient, commodious and comfortable Livings?

But this general Question divides it self into the several Questions, relating to the following Particulars, *viz.*

1. For the *Defence* of the Kingdom against Foreign Powers.
2. For preventing the *Intestine Commotions of Parties and Factions*.
3. For *Peace and Uniformity in Religion*.
4. For the *Administration of Justice*.
5. For the proportionably *Taxing* of the People, and easie *Levy*ing the same.
6. For *Gain* by Foreign Commerce.
7. For *Husbandry, Manufacture, and for Arts of Delight and Ornament*. ||
- 30 8. For lessening the *Fatigue of Carriages and Travelling*.
9. For preventing *Beggars and Thieves*.

10. For the Advancement and Propagation of *Useful Learning*.

11. For *Increasing the People by Generation*.

12. For preventing the Mischiefs of *Plagues and Contagions*. And withal, which of the said two states is most Practicable and Natural, for in these and the like particulars, do lye the *Tests and Touch-stones* of all *Proposals*, that can be made for the Publick Good.

First, as to *Practicable*, we say, That although our said Extravagant Proposals are both in Nature possible, yet it is not Obvious to every Man to conceive, how *London*, now seven times bigger than in the beginning of *Queen Elizabeths Reign*, should be seven times bigger than now it is, || and 31 49 times bigger than *Anno 1560*. To which I say, 1. That the present City of *London* stands upon less than 1500¹ Acres of Ground, wherefore a City, seven times as large may stand upon 10500 Acres, which is about equivalent to a Circle of four Miles and a half in Diameter, and less than 15 Miles in Circumference. 2. That a Circle of Ground of 35 Miles Semidiameter will bear *Corn, Garden-stuff, Fruits, Hay, and Timber*, for the four Millions 690 Thousand Inhabitants of the said City and Circle, so as nothing of that kind need be brought from above 35 Miles distance from the said City; for the Number of Acres within the said Circle, reckoning one² Acre sufficient to furnish *Bread and Drink-Corn* for every Head, and two Acres will furnish Hay for every Necessary Horse; And that the Trees which may grow in the Hedge-rows of the || Fields within the said Circle, may 31 furnish *Timber* for 600 Thousand Houses. 3. That all live Cattel and great Animals can bring themselves to the said City; and that Fish can be brought from the *Lands-end and Berwick* as easily as now. 4. Of *Coals* there is no doubt: And for Water, 20s. *per* Family (or 600 Thousand pounds *per Annum* in the whole) will serve this *City*, especially with the help of the *New River*. But if by Practicable be understood, that the present state may be suddenly changed into either of the two above-mentioned Proposals, I think it is

¹ 2d ed.; '2500 Acres.'

² 2d ed.; 'reckoning two Acres.'

not *Practicable*. Wherefore the true Question is, unto or towards which of the said two Extravagant states it is best to bend the present state by degrees, *viz.* Whether it be best to lessen or enlarge the present City? In Order where-
 33 unto we enquire (as to the first Question) which || state is most *Defensible* against *Forraign Powers*, saying, that if the above-mentioned Housing, and a border of Ground, of 3 quarters of a Mile broad, were encompassed with a Wall and Ditch of 20 Miles about (as strong as any in *Europe*, which would cost but a Million, or about a Penny in the shilling of the House-Rent for one Year) what *Foraigh Prince* could bring an Army from beyond Seas, able to beat, 1. Our Sea-Forces, and next with Horse harrass'd at Sea, to resist all the fresh Horse that *England* could make, and then Conquer above a Million of Men, well United, Disciplin'd, and Guarded within such a *Wall*, distant everywhere 3 quarters of a Mile from the Housing, to elude the *Granadoes* and great Shot of the *Enemy*? 2. As to *Intestine Parties* and *Factions*, I suppose that 4 Millions 690 Thousand People United within
 34 this great || City, could easily Govern half the said Number scattered without it, and that a few Men in Arms within the said City, and Wall, could also easily Govern the rest unarmed, or Armed in such manner as the *Sovereign* shall think fit. 3. As to *Uniformity* in *Religion*, I conceive, That if *St. Martins* Parish may (as it doth) consist of about 40 Thousand Souls, That this great City also may as well be made but as one Parish, with 7 times 130 Chappels, in which might not only be an Uniformity of Common Prayer, but in Preaching also; for that a thousand Copies of one Judiciously and Authentically Composed *Sermon* might be every Week read in each of the said *Chappels* without any subsequent Repetition of the same, as in the Case of Homilies. Whereas in *England* (wherein are near 10 Thousand Parishes,
 35 in each of which upon Sundays, Holy-days, || and other Extraordinary Occasions, there should be about 100 Sermons *per Annum*, making about a Million of Sermons *per Annum* in the whole:) It were a Miracle, if a Million of Sermons Composed by so many Men, and of so many Minds and

Methods, should produce *Uniformity* upon the discomposed understandings of about 8 Millions of Hearers.

4. As to the *Administration* of *Justice*. If in this great City shall dwell the Owners of all the Lands, and other Valuable things in *England*; If within it shall be all the *Traders*, & all the *Courts*, *Offices*, *Records*, *Furies*, and *Witnesses*; Then it follows, that *Justice* may be done with speed and ease.

5. As to the *Equality* and easie *Levy*ing of Taxes, It is too certain, That *London* hath at some time paid near half the Excise of *England*; and that the people pay || thrice as ³⁶ much for the Hearths in *London* as those in the Countrey, in proportion to the People of each, and that the Charge of Collecting these Duties, have been about a sixth part of the Duty it self. Now, in this great City the Excise alone according to the present Laws, would not only be double to the whole Kingdom, but also more equal. And the Duty of Hearths of the said City, would exceed the present proceed of the whole Kingdom. And as for the *Customs*, we mention them not at present.

6. Whether more would be *gain'd* by *Foreign Commerce*¹.

The Gain which *England* makes by *Lead*, *Coals*, the Freight of Shipping, &c. may be the same, for ought I see, in both Cases. But the Gain which is made by *Manufactures*, will be greater, as the Manufacture it self is greater and better. For in so vast || a City *Manufactures* will beget one another, ³⁷ and each *Manufacture* will be divided into as many parts as possible, whereby the Work of each *Artisan* will be simple and easie; As for Example. In the making of a *Watch*, If one Man shall make the *Wheels*, another the *Spring*, another shall Engrave the *Dial-plate*, and another shall make the *Cases*, then the *Watch* will be better and cheaper, than if the whole Work be put upon any one Man. And we also see that in *Towns*, and in the *Streets* of a great *Town*, where all the *Inhabitants* are almost of one Trade, the Commodity peculiar to those places is made better and cheaper than elsewhere. Moreover, when all sorts of *Manufactures* are

¹ 2d ed.; 'by commerce?'

made in one place, there every Ship that goeth forth, can suddenly have its Loading of so many several Particulars
 38 and Species as the Port whereunto she is bound || can take off. Again, when the several *Manufactures* are made in one place, and Shipped off in another, the *Carriage, Postage, and Travelling-charges* will Inhance the Price of such *Manufacture*, and lessen the Gain upon *Foreign Commerce*. And lastly, when the Imported Goods are spent in the Port it self, where they are Landed, the Carriage of the same into other places, will create no surcharge upon such Commodity; all which particulars tends to the greater Gain by *Foreign Commerce*.

7. As for *Arts of Delight and Ornament,*

They are best promoted by the greatest Number of *Emulators*. And it is more likely that one *Ingenious Curious Man* may rather be found out amongst 4 Millions than 400 Persons. But as for *Husbandry, viz. Tillage and Pasturage,*
 39 I see no Reason, but the second state (when || each Family is charged with the Culture of about 24 Acres) will best promote the same.

8. As for lessening the Fatigue of *Carriage and Travelling,*

The thing speaks it self, for if all the Men of Business, and all *Artisans* do Live within five Miles of each other; And if those who Live without the great City, do spend only such Commodities as grow where they Live, when the charge of Carriage and Travelling could be little.

9. As to the preventing of *Beggars and Thieves,*

I do not find how the differences of the said two states should make much difference in this particular; for Impotents (which are but one in about 600) ought to be maintained by the rest. 2. Those who are unable to work, through the evil Education of their *Parents*, ought (for ought I know) to be
 40 main-||tained by their nearest Kindred, as a just Punishment upon them. 3. And those who cannot find Work (though able and willing to perform it) by reason of the unequal application of Hands to Lands, ought to be provided for by the *Magistrate* and *Land-Lord* till that can be done; for there needs be no *Beggars* in Countries, where there are

many Acres of unimproved improvable Land to every Head, as there are in *England*. As for *Thieves*, they are for the most part begotten from the same Cause; For it is against Nature, that any Man should venture his Life, Limb, or Liberty, for a wretched Livelyhood, whereas moderate Labour will produce a better. But of this see Sir *Thomas Moor*, in the first part of his *Utopia*¹.

10. As to the *Propagation* and *Improvement* of *Useful Learning*, ||

The same may be said concerning it as was above-said ⁴¹ concerning *Manufactures*, and the *Arts of Delight* and *Ornaments*; for in the great vast City, there can be no so odd a Conceit or Design, whereunto some Assistance may not be found, which in the thin, scattered way of Habitation may not be.

11. As for the *Increase of People by Generation*,

I see no great difference from either of the two states, for the same may be hindred or promoted in either, from the same Causes.

12. As to the *Plague*,

It is to be remembred that one time with another, a *Plague* happeneth in *London* once in 20 Years, or thereabouts; for in the last hundred Years, between the Years 1582 and 1682, there have been five great *Plagues*, viz. Anno 1592, 1603, 1625, 1636, and 1665. And it is also to || be remembred that the *Plagues* of *London* do commonly kill ⁴² one fifth part of the *Inhabitants*. Now, if the whole People of *England* do double but in 360 Years, then the Annual Increase of the same is but 20000, and in 20 Years 400000. But if in the City of *London* there should be two Millions of People, (as there will be about 60 Years hence) then the *Plague* (killing one fifth of them, namely, 400000 once in 20 Years) will destroy as many in one Year, as the whole Nation can re-furnish in 20: And consequently the People of the Nation shall never Increase. But if the People of *London* shall be above 4 Millions (as in the first of our two *Extravagant* Suppositions is premised) then the People of

¹ Lupton's ed., p. 58.

the whole Nation shall lessen above 20000 *per Annum*. So as if People be worth 70*l.* *per* Head (as hath elsewhere
43 been shown¹) || then the said greatness of the City will be a damage to it self and the whole Nation of 14 hundred Thousand pounds *per Annum*, and so *pro rata*, for a greater or lesser Number; wherefore to determine, which of the two *states* is best, (that is to say, towards which of the said two *states Authority* should bend the present *state*) a just Balance ought to be made between the disadvantages from the *Plague*, with the Advantages accruing from the other Particulars above-mentioned; unto which *Balance* a more exact Account of the People, and a better Rule for the Measure of its Growth is Necessary, than what we have here given, or are yet able to lay down. ||

¹ See note 2, p. 454.

Post-script.

44

IT was not very pertinent to a Discourse concerning the *Growth* of the City of *London*, to thrust in Considerations of the Time when the whole *World* will be fully Peopled; and how to justify the *Scriptures* concerning the Number of People mentioned in them; and concerning the Number of the Quick and the Dead, that may Rise at the last Day, &c. Nevertheless, since some Friends liking the said Digressions and Impertinencies (perhaps as sauce to a dry Discourse) have desired that the same might be explain'd and made out. I therefore say as followeth.

1. If the Number of Acres in the Habitable part of the Earth, be under || 50 Thousand Millions; if Twenty Thousand ⁴⁵ Millions of People, are more than the said Number of Acres will feed; (few or no Countries being so fully Peopled;) and for that in six doublings (which will be in 2000 Years) the present 320 Millions will exceed the said 20 Thousand Millions.

2. That the Number of all those who have dyed since the *Flood*, is the sum of all the Products made by Multiplying the Number of the doubling Periods mentioned in the first Column of the last Table, by the Number of People respectively affixed to them, in the third Column of the same Table; the said sum being Divided by 40 (one dying out of 40 *per Annum*, out of the whole Mass of Mankind) which Quotient is 12570 Millions; Whereunto may be added, for those that dyed before the *Flood*, enough to make the last-||mentioned ⁴⁶

Number 20 Thousand Millions, as the full Number of all that dyed, from the beginning of the World, to the Year 1682; unto which, if 320 Millions, the Number of those who are now alive, be added, the Total of the Quick and the Dead, will amount but unto one fifth part of the Graves, which the surface of *Ireland* will afford, without ever putting two Bodies into any one Grave; for there be in *Ireland* 28 Thousand square *English* Miles, each whereof will afford about 4 Millions of Graves, and consequently above 114 Thousand Millions of Graves, *viz.* about 5 times the Number of the Quick and the Dead, which should arise at the last Day, in case the same had been in the Year 1682.

3. Now, if there may be place for five times as many
 47 Graves in *Ireland*, as sufficient for all that ever || dyed; And if the Earth of one Grave weigh five times as much as the Body Interr'd therein, then a Turf, less than a Foot thick, pared off from a fifth part of the surface of *Ireland*, will be equivalent in bulk and weight to all the Bodies that ever were Buried; And may serve as well for that purpose, as the two Mountains afore-mentioned in the body of this Discourse. From all which it is plain, how madly they were mistaken, who did so petulantly vilifie what the *Holy Scriptures* have delivered.

FINIS.

OBSERVATIONS
UPON THE
Dublin-Bills
OF
MORTALITY,
M D C L X X X I.
AND THE
STATE of that CITY.

By the Observator¹ on the LONDON
Bills of MORTALITY.



LONDON:

Printed for *Mark Pardoe*, at the Sign of
the *Black Raven*, over against *Bedford-*
house in the *Strand*. 1683.

¹ On the significance of this apparent ascription of the *London Observations* to Petty, see Introduction, also an article by the editor in *Polit. Sci. Quart.* XI. 113, 131.

NOTE ON THE DUBLIN "OBSERVATIONS."

THE earliest known reference to the Dublin bills is an order in the city assembly roll for the fourth Friday after Christmas, 1658, for the treasurer of the city to pay, on Mr Mayor's warrant, to John Tadpole, fifty shillings sterling for his employment heretofore in bringing in the weekly bills of mortality within the city and the suburbs thereof¹. To these bills Petty turned his attention upon the first trip which he made to Dublin after the publication of Graunt's book². It was not, however, until after the death of his friend that he undertook his Observations upon them. Concerning the Observations he writes to Southwell, 25 November, 1682, that he will meddle no more with political arithmetic nor ratiocinations, but will turn beast and grow absurd, as the glorious men of the world are. The accompanying pamphlet is not a startling from his resolutions, "for it was put a printing when I first came to town³, and hath been kept in hand by my brother beast Mark Pardo, the stationer.... I would have you run to the city of Bristol with the same and bore their skulls with the same advice that is here given for Dublin⁴."

¹ Gilbert, *Calendar*, IV. 154.

² *Letter*, to Brouncker, 4 February, 1663, printed in note 2, p. 398.

³ June 1682, Fitzmaurice, 250.

⁴ Thorpe, *Cat. lib. MSS. bibl. Southwellianæ*, 405.

OBSERVATIONS
UPON THE
DUBLIN-Bills of Mortality, 1681.
AND THE
State of that CITY.

THE Observations upon the *London-Bills of Mortality* have been a new Light to the World; and the like Observation upon those of *Dublin*, may serve as Snuffers to make the same Candle burn clearer.

The *London*-Observations flowed from *Bills* regularly kept for near One hundred years; but these are squeezed out of Six stragling *London*-Bills, out of Fifteen *Dublin Bills*, and from a Note of the *Families* and *Hearths* in each *Parish* of *Dublin*; which are all digested into the one *Table* or Sheet annexed, consisting of Three Parts, markt *A, B, C*; being indeed the *A, B, C*, of *Publick Oeconomy*, and even of that *Policy* which tends to Peace and Plenty. ||

Observations upon the Table A.

1. THE Total of the *Burials* in *London*, (for the said Six stragling years mentioned in the *Table A*) is 120170; whereof the Medium or Sixth part is 20028; and exceeds the *Burials* of *Paris*, as may appear by the late *Bills* of that City.

2. The *Births*, for the same time, are 73683, the Medium

or Sixth part whereof is 12280, which is about Five eighth parts of the *Burials*; and shews, that *London* would in time decrease quite away, were it not supplied out of the Country, where are about Five *Births* for Four *Burials*, the proportion of Breeders in the Country being greater than in the City.

3. The *Burials* in *Dublin* for the said Six years, were 9865, the Sixth part or Medium whereof is, 1644, which is about the Twelfth part of the *London-Burials*; and about a Fifth part over. So as the people of *London* do hereby seem to be above Twelve times as many as those of *Dublin*.

4. The *Births* in the same time at *Dublin*, are 6157, the Sixth part or Medium whereof is 1026, which is also about five eighth parts of the 1644 *Burials*; which shews, that the ||
3 proportion between *Burials* and *Births* are alike at *London* and *Dublin*, and that the Accompts are kept alike; and consequently are likely to be true, there being no Confederacy for that purpose: Which if they be true, we then say,

5. That the *Births* are the best way¹ (till the Accompts of the people shall be purposely taken) whereby to judge of the Increase and Decrease of People, that of *Burials* being subject to more Contingencies and variety of Causes.

6. If *Births* be as yet the measure of the People, and that the Births (as has been shewn) are as Five to Eight, then Eight fifths of the Births is the number of the Burials, where the year was not considerable for extraordinary Sickness or Salubrity; and is the Rule whereby to measure the same. As for Example: The Medium of Births in *Dublin* was 1026, the Eight fifths whereof is 1641, but the real Burials were 1644; so as in the said years they differed little from the 1641, which was the *Standard of Health*; and consequently, the years 1680, 1674, and 1668, were *sickly* years, more or less, as they exceeded the said Number 1641; and the rest were *healthful* years, more or less, as they fell short of the same number. But the City was more or less
4 *Populous*, as the Births differ-|led from the Number 1026; viz. *Populous* in the years 1680, 1679, 1678, & 1668: For

¹ On the deficiencies of the London birth returns see Graunt, p. 361, also Introduction.

other causes of this difference in Births, are very occult and uncertain.

7. What hath been said of *Dublin*, serves also for *London*.

8. It hath already been observ'd by the *London-Bills*, That there are more *Males* than *Females*¹. It is to be further noted, that in these Six *London-Bills* also, there is not one instance either in the Births or Burials to the contrary.

9. It hath been formerly observ'd, That *in, the years wherein most dye, fewest are born, & vice versâ*². The same may be further observ'd in *Males* and *Females*, *viz.* When fewest *Males* are born, then most dye: for here the *Males* dyed as Twelve to Eleven, which is above the mean proportion of Fourteen to Thirteen, but were born but as Nineteen to Eighteen, which is below the same.

Observations upon the Table B.

1. FROM the Table *B*, it appears, That the Medium of the Fifteen years Burials, (being 24199) is 1613, whereas the Medium of the other six years in the Table *A*, was 1644, and that the Medium of the Fifteen || years Births ⁵ (being in all 14765) is 984, whereas the Medium of the said other six years, was 1026³. That is to say, there were both fewer Births and Burials in these Fifteen years, than in the other six years; which is a probable sign that at a Medium there were fewer People also.

2. The Medium of *Births* for the Fifteen years being 984, whereof Eight fifths (being 1576) is the *Standard of Health* for the said Fifteen years; and the triple of the said 1576, being 4728, is the standard for each of the Ternaries of the Fifteen years within the said Table.

3. That 2952, the triple of 984 Births, is for each Ternary the Standard of Peoples increase and decrease from the year

¹ Graunt, p. 374.

² *Ib.* p. 368.

³ Table A gives the births in 1672 at 987, table B at 967; these numbers are used for the averages respectively.

1666 to 1680 inclusive, *viz.* The People increased in the second Ternary, and decreased from the same in the Third and Fourth Ternarys, but re-increased in the Fifth Ternary beyond any other.

4. That the last Ternary was withal very healthful, the Burials being but 4624, *viz.* below 4728, the Standard.

5. That according to this proportion of increase, the Housing of *Dublin* have probably increased also. ||

1. **F**irst, from the Table *C*, it appears, 1. That the Housing of *Dublin* is such, as that there are not five Hearths in each House one with another, but nearer five than four.

2. That in *St. Warburghs* Parish are near six Hearths to an House. In *St. Johns* five. In *St. Michaels* above five. In *St. Nicholas within* above six. In *Christ-Church* above seven. In *St. James's*, and *St. Katherines*, and in *St. Michans*, not four. In *St. Kevans* about four.

3. That in *St. James's*, *St. Michans*, *St. Brides*, *St. Warburgh*, *St. Andrews*, *St. Michaels*, and *St. Patricks*, all the Christnings were but 550, and the Burials 1055, *viz.* near double; and that in the rest of the Parishes the Christnings were five, and the Burials seven, *viz.* as 457 to 634¹. Now whether the cause of this difference were negligence in Accompts, or the greaterness of the Families, &c. is worth inquiring.

4. It is hard to say in what order (as to greatness) these Parishes ought to stand, some having most Families; some most Hearths, some most Births, and others most Burials. 7 Some Parishes exceeding the rest in two, || others in three of the said four particulars, but none in all four. Wherefore

¹ According to table C, the total burials in the enumerated parishes are 1000, not 1055, the total christenings are 585, not 550, while the total burials in the rest of the parishes are 789, not 634 and the total christenings are 422 not 457.

this Table ranketh them according to the plurality of the said four particulars wherein each excelleth the other.

5. The *London-Observations* reckon eight heads in each Family¹; according to which estimation, there are 32000 Souls² in the 4000 Families of *Dublin*; which is but half of what most Men imagine; of which but about one sixth part are able to bear Arms, besides the Royal Regiment.

6. Without the knowledge of the true *number of People*, as a Principle, the whole scope and use of the keeping Bills of Births and Burials is impaired; wherefore by laborious Conjectures and Calculations to deduce the number of People from the Births and Burials, may be Ingenious, but very preposterous.

7. If the number of *Families in Dublin* be about 4000, then Ten Men, in one week (at the Charge of about Five pound, Surveying Eight Families in an hour) may directly, and without Algebra, make an Accompt of the whole People, expressing their several Ages, Sex, Marriages, Title, Trade, Religion, &c. and those who survey the Hearths, or the Constables or Parish Clerks, (may, if required) do the same *ex Officio*, and without other Charge, by the Command of the Chief Governor, the Diocesan, or the Mayor³.

8. The Bills of *London* have since their beginning, admitted several Alterations and Improvements; and eight or ten pound *per annum* surcharge, would make the Bills of *Dublin* to exceed all others, and become an excellent Instrument of Government. To which purpose the Forms for

¹ Graunt, p. 385.

² Graunt had estimated 30,000 in 1662, see p. 399.

³ How entirely Petty's dispute about the Down Survey occupied his attention in 1659 is evident from his ignorance of the census which was taken in Dublin and elsewhere in that year. It gave the number of all the people in eleven parishes (Christ Church and Nicholas without omitted) at 8780. Gilbert, *Calendar*, IV. 571, also p. xiii. Mr Hardinge shews reason for believing that Petty had copies of the returns of that census for nearly the whole of Ireland. If he had, it is not likely that he secured them until after the writing of the *Dublin Observations*, as neither the *Observations* nor the *Polit. Anat.* mentions the census of 1659. See Hardinge, *The earliest known MS. Census Returns of the People of Ireland*, in *Trans. R. I. Acad.*, vol. xxiv. antiquities, pp. 317-328.

Weekly, Quarterly, and Yearly Bills are humbly recommended, *viz.*¹

YEARLY BILLS OF MORTALITY FOR					LONDON.			
LONDON and DUBLIN					BURIALS.		BIRTHS.	
ANNO.	Burials.	Births.	Burials.	Births.	Males.	Females.	Males.	Females.
1680	21053	12747	1826	1006	11039	10044	6543	6199
1679	21730	12288	1397	1061	11154	10576	6247	6041
1678	20678	12601	1401	1045	10681	9977	6568	6033
1674	21201	11851	2106	942	11000	10196	6113	5738
1672	18230	12563	1436	987	9560	8070	6443	6120
1668	17278	11633	1699	1026	9111	8167	6073	5566
	120170	73683	9865	6157	62545	57030	37992	35697
The medium or 6th part whereof is	20028	12280	1644	1026	10424	9505	6332	5949

A

DUBLIN.				
Anno.	Burials.	Births.	In Ternaries of years.	
1666	1480	952	4821	2979
1667	1642	1001		
1668	1699	1026	5353	3070
1669	1666	1000		
1670	1713	1067	5073	2842
1671	1974	1003		
1672	1436	967	4328	2672
1673	1531	933		
1674	2106	942	4624	3202
1675	1578	823		
1676	1391	952	4624	3202
1677	1359	897		
1678	1401	1045	4624	3202
1679	1397	1061		
1680	1826	1096	24199	14765
	24199	14765		
The medium or 15th part whereof is	1613	984	1613	984

B

¹ The tables A, B, and C are printed, in the 1683 edition, upon sheets inserted after p. 8 of the pamphlet, so that "A Weekly Bill of Mortality for the City of Dublin," here printed on p. 487, there follows immediately after the recommendation of it.

Casualties and Diseases.

Aged above 70 years.
Abortive and Still-born.
Childbed-women.
Convulsion.
Teeth.
Worms.
Gout, and Sciatica.
Stone.
Palsey.
Consumption, and French Pox.
Dropsie, and Tympany.
Rickets, and Livergrown.
Head-ach and Megrin.
Epilepsie, and Planet.
Fever, and Ague.
Pleurisie.
Quinsey.
Executed, Murder'd, Drown'd.
Plague, and Spotted-Fever.
Griping of the Guts.
Scowring, Vomiting, Bleeding.
Small Pox.
Measels.
Neither of all the other sorts.

A
P O S T S C R I P T
T O T H E
S T A T I O N E R .

WHereas you complain, that these Observations make no sufficient Bulk, I could answer you, That I wish the Bulk of all Books were less ; but do never-the-less comply with you in adding what follows, *viz.*

1. That the Parishes of *Dublin* are very unequal ; some having in them above Six hundred Families, and others under Thirty.

2. That, Thirteen Parishes are too few for Four thousand Families ; the midling Parishes of *London* containing One hundred and twenty Families ; according to which rate, there should be about Thirty three Parishes in *Dublin*.

3. It is said, that there are Eighty four thousand Houses or Families in *London*, which is Twenty one times more than are in *Dublin* ; and yet the Births and Burials of *London* are but Twelve times those of *Dublin* : which shews that the Inhabitants of *Dublin* are more crowded and streightned in their Housing, than those of *London* ; and consequently, that to increase the Buildings of *Dublin*, will make that City more conformable to *London*.

4. I shall also add some Reasons for altering the present forms of the *Dublin*-Bills of Mortality, according to what hath been here recommended, *viz.*

1. We give the distinctions of Males and Females in the Births onely; for that the Burials must, at one time or another, be in the same proportion with the Births. ||

2. We do in the Weekly and Quarterly Bills propose, that notice be taken in the Burials of what numbers dye above Sixty and Seventy, and what under Sixteen, Six, and Two years old; foreseeing good uses to be made of that distinction.

3. We do in the Yearly Bill, reduce the Casualties to about Twenty four, being such as may be discerned by common sense and without Art; conceiving that more will but perplex and imbroil the Account. And in the Quarterly Bills, we reduce the Diseases to Three Heads, *viz.* Contagious, Acute, and Chronical; applying this distinction to Parishes, in order to know how the different Scituation, Soil, and way of living in each Parish, doth dispose Men to each of the said Three Species: and in the Weekly Bills we take notice not only of the Plague, but of the other Contagious Diseases in each Parish; that strangers and fear-ful Persons may thereby know how to dispose of themselves.

4. We mention the Number of the People, as the Fundamental Term in all our proportions; and without which, all the rest will be almost fruitless.

5. We mention the number of Marriages made in every Quarter, and in every year; as also the proportion which Married Persons bear to the whole; expecting in such Observations to read the improvement of the Nation.

6. As for Religions, we reduce them to Three, *viz.*
1. Those who have the Pope of *Rome* for their Head.
2. Who are Governed by the Laws of their Country.
3. Those who rely respectively upon their own private Judgments. Now whether these distinctions should be taken notice of or not, we do but faintly recommend, seeing many Reasons *pro* and *con* for the same: and therefore although we have mentioned it as a matter fit to be considered, yet we humbly leave it to Authority.||

FURTHER
OBSERVATION
UPON THE
Dublin-Bills:
OR,
ACCOMPTS
OF THE
Houses, Hearths, Baptisms,
And Burials in that
CITY.

The Second Edition, Corrected and Enlarg'd.

By Sir *WILLIAM PETTY*,
Fellow of the *Royal Society*.

L O N D O N:

Printed for *Mark Pardoe*, at the Sign of
the *Black Raven*, over against *Bed-*
ford-House in the *Strand*. 1686.

NOTE ON THE "FURTHER OBSERVATIONS."

IN 1686 the Further Observations were prefixed to the Observations upon the Dublin Bills as issued in 1683, and the whole was put forward as a "second edition, corrected and enlarg'd." In fact, however, the original Observations of 1683 were not even reprinted in 1686, the left-over sheets being utilized, and the only change being the suppression of the 1683 title given at p. 479. The following four pages, therefore, include all that was ever added to the 1683 Observations.

The STATIONER
TO THE
READER.

I Have not thought fit to make any Alteration of the first Edition, but have only added a New Table, with Observation upon it, placing the same in the front of what was before; which perhaps might have been as well placed after the like Table at the 8th Page of the first Edition.

DUBLIN, 1682.				
Parishes.	Houses.	Fire-places.	Baptiz'd.	Buri'd.
St. <i>James</i> ,	272	836}	122	306
St. <i>Katharines</i> ,	540	2198}		
St. <i>Nicholas</i> with- out, and St. <i>Patricks</i> } St. <i>Bridgets</i>	1064	4082	145	414
St. <i>Audones</i>	395	1903	68	149
St. <i>Michael</i>	276	1510	56	164
St. <i>Johns</i>	174	884	34	50
St. <i>Nicholas</i> within, and Christ-Church <i>Lib.</i> }	302	1636	74	101
St. <i>Warbors</i>	153	902	26	52
St. <i>Michans</i>	240	1638	45	105
St. <i>Andrews</i>	938	3516	124	389
St. <i>Kevals</i>	864	3638	131	300
<i>Donabrook</i>	554	2120}	87	233
	253	506}		
	6025	25369	912	2263

Further Observations upon the *Dublin* Accompts of Baptisms and Burials, Houses and Hearths, *viz.*

The Table hath been made for the Year 1682, wherein is to be noted, ||

1. That the Houses which *Anno* 1671, were but 3850 are *Anno* 1682, 6025; but whether this difference is caused by the real encrease of Housing, or by fraud and defect in the former Accompts, is left to consideration. For the Burials or

People have increased but from 1696, to 2263, according to which proportion, the 3850 Houses *Anno* 1671, should *Anno* 1682 have been but 5143, wherefore some fault may be suspected as aforesaid, when Farming the Hearth-mony was in agitation¹.

2. The Hearths have encreased according to the Burials, and $\frac{1}{3}$ of the said increase more, *viz.* the Burials *Anno* 1671 were 1696, the $\frac{1}{3}$ whereof is 563, which put together makes 2259, which is near the number of Burials *Anno* 1682. But the Hearths *Anno* 1671 were 17500, whereof the $\frac{1}{3}$ is 5833, making in all but 23333; whereas the whole Hearths || *Anno* 3 1682 were 25369, *viz.* $\frac{1}{3}$ and better of the said 5833 more.

3. The Housing were *Anno* 1671, but 3850, which if they had encreased *Anno* 1682 but according to the Burials, they had been but 5143, or according to the Hearths, had been but 5488, whereas they appear 6025, encreasing double to the Hearths. So as 'tis likely there hath been some error in the said Account of the Housing, unless the new Housing be very small, and have but one Chimney apiece, and that $\frac{1}{4}$ part of them are untenanted. On the other hand, 'tis more likely that when 1696 dy'd *per An.* there were near 6000; for 6000 Houses at 8 Inhabitants *per* House, would make the number of the People to be 48 Thousand, and the number of 1696 that died according to the Rule of One out of 30, would have made the number of Inhabitants about 50 Thousand: For which reason I continue to || believe there was some 4 Error in the Accompt of 3850 Houses as aforesaid, and the rather because there is no ground from experience to think that in 11 year, the Houses in *Dublin* have encreased from 3850 to 6025.

Moreover, I rather think that the number of 6025 is yet short, because that number at 8 heads *per* House makes the Inhabitants to be but 48200; whereas the 2263 who died in the year 1682, according to the aforementioned Rule of one dying out of 30 makes the number of People to be 67890;

¹ In the years 1674-75. It appears that Petty had suggested to Essex certain reforms in the collection of the hearth money, for the farm of which he was one of the bidders. Fitzmaurice, 169, *Capel Letters*, pp. 399-418.

the *Medium* betwixt which number and 48200 is 58045, which is the best estimate I can make of that matter, which I hope Authority will ere long rectifie, by direct and exact Enquiries.

4. As to the Births, we say that *Anno* 1640, 1641, and 1642, at *London*, just before the Troubles in Religion began, the Births were $\frac{1}{2}$ of the || Burials, by reason I suppose of the greatness of Families in *London* above the Country, and the fewer Breeders, and not for want of Registring. Wherefore, deducting $\frac{1}{2}$ of 2263, which is 377, there remains 1886 for the probable number of Births in *Dublin* for the year 1682; whereas but 912 are represented to have been Christen'd in that year, though 1023 were christened *Anno* 1671, when there died but 1696; which decreasing of the Christnings, and increasing of the Burials, shews the increase of Non-registering in the Legal Books, which must be the increase of *Roman Catholicks* at *Dublin*.

The scope of this whole Paper therefore is, That the People of *Dublin* are rather 58000, than 32000¹; and that the Dissenters, who do not Register their Baptisms, have increased from 391 to 974: but of Dissenters, none || have increased but the *Roman Catholicks*, whose Numbers have increased from about 2 to 5 in the said Years. The exacter Knowledge whereof, may also be better had from direct Enquiries.

FINIS.

¹ Petty previously calculated 32000 inhabitants in Dublin. See p. 485.



WHITE-HALL,

Aug. 26th 1686.

Let this Paper be printed.

Sunderland P.



T W O
E S S A Y S

I N

Political Arithmetick,

Concerning the

People, Housing, Hospitals, &c.

O F

L O N D O N and P A R I S.

By Sir *WILLIAM PETTY*,
Fellow of the Royal Society.

———*Qui sciret Regibus uti*
*Fastidiret olus*¹———

L O N D O N,
Printed for *J. Lloyd* in the Middle Exchange
next *Salisbury-House* in the *Strand*. 1687.

1

'Si pranderet olus patienter, regibus uti
Nollet Aristippus.' 'Si sciret regibus uti,
Fastidiret olus, qui me notat.' Utrius horum
Verba probes et facta doce vel junior audi,
Cur sit Aristippi potior sententia.

Horace, *Epistles*, I. 17, 13-17.

The story of the conversation between Aristippus and Diogenes is told by Diogenes Laertius.

NOTE ON THE "TWO ESSAYS."

PERRY'S Two Essays concerning London and Paris, though first published in French, were originally written in English¹. They were probably finished between the 17 July, 1686, the day on which was licensed no. 180 of the Philosophical Transactions containing the account of Verbiest's journeys referred to in the first essay², and the 26 August of the same year, when the Two Essays were themselves approved³.

¹ Bibliography, 18. The French Version declares itself to be "Traduit de l'Original Anglois."

² P. 508.

³ P. 500.

TO THE
KING'S
Most Excellent MAJESTY.

I *Do presume, in a very small Paper, to shew Your Majesty that Your City of London seems more considerable than the Two best Cities of the French Monarchy, and for ought I can find, greater than any other of the Universe, which because I can say || without flattery, and by such Demonstration as Your Majesty can examine, I humbly pray Your Majesty to accept from*

Your Majesty's

Most Humble, Loyal

and Obedient Subject,

William Petty.



1

A N
E S S A Y
I N
Political Arithmetick,
B Y
Sir *WILLIAM PETTY*,

Tending to prove that *London* hath more People and Housing than the Cities of *Paris* and *Rouen* put together, and is also more considerable in several other respects¹.

1. **T**HE Medium of the *Burials* at *London* in the three last years, *viz.* 1683, 1684 and 1685, (wherein there was no extraordinary Sick-ness, and wherein the *Christenings* 2

¹ The common notion at the time when Petty wrote appears to have been that Paris must be larger than London because the court of Louis XIV. was more splendid than that of Charles II. Petty was not the first who held London the larger, but he appears to have been the first who gave an adequate reason for his belief. Gregorio de Leti says that he himself had once believed Paris the more populous city, but 'all the more general and infallible rules' had shewn him the superiority of London. De Leti had unusual opportunities for observation, but his estimate of the actual population of the two cities is absurdly high. He appears to credit, somewhat grudgingly, the assertion of an (unidentified) French ambassador, who had told him that Paris contained a million and a half of people. And he is 'forced to believe' that in London there are not less than two million souls! *Del teatro britannico* (1683), p. 75. A more trustworthy account is given by Le Maire, the author of *Paris ancien et nouveau*, 1685. After quoting Giovanni Botero (1540-1617) on "Parigi città che di popolo & di abbondanza d'ogni cosa avanza de gran lunga tutte l'altre di Christianità," Le Maire gives the number of people and of houses in each of the sixteen quarters of La Ville de Paris—as in the case of London, an area smaller than that included in the bills of

do correspond in their ordinary proportions with the *Burials* and *Christenings* of each year one with another) was 22337, and the like Medium of *Burials* for the three last *Paris Bills* we could procure, *viz.* for the years 1682, 1683 and 1684 (whereof the last as appears by the *Christenings* to have been very sickly) is 19887¹.

2. The City of *Bristol*² in *England* appears to be by good estimate of its *Trade* and *Customes* as great as *Rouen* in *France*, and the City of *Dublin* in *Ireland* appears to have more Chimnies than *Bristol*, and consequently more People, and the *Burials* in *Dublin* were *Anno* 1682 (being a sickly year) but 2263.

3. Now the *Burials* of *Paris* (being 19887) being added to the *Burials* of *Dublin* (supposed more than at *Rouen*) being 2263, makes but 22150, whereas the *Burials* of *London* were 187 more, or 22337, or as about 6 to 7³.

4. If those who die unnecessarily, and by miscarriage in *L'hostel Dieu* in *Paris* (being above 3000) as hath been elsewhere shewn⁴, or any part thereof, should be subtracted out of the *Paris Burials* aforementioned, then our assertion will be stronger, and more proportionable to what follows concerning the Housing of those Cities, *viz.*

mortality—according to an enumeration made in 1684. The totals are 91,252 persons and 20,641 houses. Le Maire, pp. 5-15. The enumeration of 1684 is reprinted in Boislesle's *Mémoire de la Généralité de Paris* (in the *Documents inédits*), p. 422. A modern estimate gives 543,270 inhabitants to the Paris of 1684. Husson, *Les Consommations de Paris* (1856), p. 20.

¹ In Paris there died 17,493 in 1682 and 17,764 in 1683, which, according to Petty's average of 19,887, would leave 24,404 deaths in the "very sickly" year 1684. In the first nine months of 1684, for which alone the official compilers of the *Recherches statistiques* could recover the figures, there died 18,737. The average mortality 1670-1675, 1678-1683 was 19,684. *Recherches*, II., tableau 53. The figures for 1676, 1677 and 1685-1687 are probably lost. They may perhaps be preserved in Grimperel's MS. in the Bibliothèque de l'Institut National de France (n° X. 214, 2 vols. in f°), which I have not seen.

² Petty's informant concerning Bristol may have been Sir Robert Southwell, whose seat, King's Weston, was near that town, cf. p. 480, note on the Dublin Observations.

³ Six to seven is approximately the ratio between the burials of Paris alone and the burials of London.

⁴ See p. 511.

5. There were burnt at *London*, Anno 1666, above 13000 houses, which being but a fifth part of the whole, the whole number of houses in the said year, were above 65000; and whereas the ordinary *Burials* of *London* have increased between the years 1666 and 1686, above *one third* the total of the houses at *London* Anno 1686, must be about 87000, which Anno 1682, appeared by accmpt to have been 84000¹.

6. *Monsieur Morery*, the great French Author of the late *Geographical Dictionaries*², who makes *Paris* the greatest City in the *World*, || doth reckon but 50000 houses in the same, 5 and other Authors and knowing Men much less; nor are there full 7000 houses in the City of *Dublin*, so as if the 50000 houses of *Paris*, and the 7000 houses in the City of *Dublin* were added together, the total is but 57000 Houses, whereas those of *London* are 87000 as aforesaid, or as 6 to 9.

7. As for the Shipping and foreign Commerce of *London*, the common sense of all Men doth judge it to be far greater than that of *Paris* and *Rouen* put together.

8. As to the Wealth and Gain accruing to the Inhabitants of *London* and *Paris* by Law-suits (or *La chicane*)³ I onely say that the Courts || of *London* extend to all *England* and 6 *Wales*, and affect seven Millions of People, whereas those of *Paris* do not extend near so far: Moreover there is no palpable conspicuous argument at *Paris* for the Number and Wealth of Lawyers like the Buildings and Chambers in the *Two Temples*, *Lincoln's Inn*, *Gray's Inn*, *Doctors Commons*, and the seven other Inns in which are ⁴ Chimnies, which are to be seen at *London*, besides many Lodgings, Halls, and Offices relating to the same.

9. As to the plentifull and easie living of the People we say,

1. That the People of *Paris* to those of *London*, being as

¹ See p. 459, note 5.

² "Les Modernes assurent qu'elle [la ville de Paris] a aujourd'huy environ cinquante mille Maisons." *Le grand dictionnaire historique ou le mélange curieux de l'histoire sacrée et profane. Seconde édition, revue par M. Louys Moreri.* A. Lyon, M.D.C. LXXXI., vol. II. p. 823 b.

³ On Petty's attitude towards the law and lawyers see Fitzmaurice, 169-172.

⁴ A blank in both French and English editions.

7 a-||bout 6 to 7, and the Housing of the same as about 6 to 9, we infer that the People do not live at *London* so close and crouded as at *Paris*, but can afford themselves more room and liberty.

2. That at *London* the *Hospitals* are better and more desirable than those of *Paris*, for that in the best at *Paris* there die 2 out of 15¹, whereas at *London* there die out of the worst scarce 2 of 16, and yet but a fiftieth part of the whole die out of the *Hospitals* at *London*, and $\frac{3}{8}$ or 20 times that proportion die out of the *Paris Hospitals* which are of the same kind; that is to say, the number of those at *London*,
8 who chuse to lie sick in *Hospitals* rather than || in their own Houses, are to the like People of *Paris* as one to twenty; which shews the greater Poverty or want of Means in the People of *Paris* than those of *London*.

3. We infer from the premisses, *viz.* the dying scarce 2 of 16 out of the *London Hospitals*, and about 2 of 15 in the best of *Paris*, (to say nothing of *L'hostel Dieu*) That either the *Physicians* and *Chirurgeons* of *London* are better than those of *Paris*, or that the Air of *London* is more wholesome.

10. As for the other great Cities of the *World*, if *Paris*
9 were the greatest we need say no more || in behalf of *London*. As for *Pequin* in *China*, we have no account fit to reason upon; nor is there anything in the Description of the two late Voyages of the *Chines's Emperour* from that City into East and West *Tartary*², in the years 1682 and 1683, which

¹ The Paris bills entered the hospitals separately from the parishes in which they were situated. See p. 510.

² Ferdinand Verbiest, S. J. (1625—1688) wrote *Voyage de l'Empeur de la Chine dans la Tartarie; aux quelles on a joint une nouvelle découverte aux Mexique*. Paris: chez E. Michellet; 1685, 12°. Verbiest's accounts were received with great interest in Europe. An English translation of them was included in *A Relation of the Invasion and Conquest of Florida by the Spaniards, under the Command of Fernando de Soto. Written in Portuguese by a Gentleman of the Town of Elvas. Now Englished. To which is subjoynd Two Journeys of the present Emperour of China into Tartary in the Years 1682 and 1683*. London: printed for John Lawrence, 1686 (licensed 7 June), 12°, and a translation was also published in the *Philosophical Transactions*, vol. xvi. no. 180, pp. 39—62. On Verbiest see R. H. Major's introduction to the Earl of Ellesmere's translation of

can make us recant what we have said concerning *London*. As for *Dely* and *Agra* belonging to the *Mogull* we find nothing against our position, but much to shew the vast numbers which attend that *Emperour* in his business and pleasures.

11. We shall conclude with *Constantinople* and *Gran Cairo*; as for *Constantinople* it hath been said by one who endeavour'd to shew || the greatness of that City, and the ¹⁰ greatness of the *Plague* which reigned in it, that there died 1500 *per diem*, without other circumstances: To which we answer, that in the year 1665 there died in *London* 1200 *per diem*, and it hath been well proved that the *Plague* of *London* never carried away above $\frac{1}{4}$ of the People, whereas it is commonly believed that in *Constantinople*, and other *Eastern Cities*, and even in *Italy* and *Spain*, that the *Plague* takes away $\frac{2}{3}$ one half or more; wherefore where 1200 is but $\frac{1}{4}$ of the People it is probable that the number was greater, than where 1500 was $\frac{2}{3}$ or one half, &c. ||

12. As for *Gran Cairo* it is reported, that 73000 died in ¹¹ 10 weeks or 1000 *per diem*¹, where note, that at *Gran Cairo* the *Plague* comes and goes away suddenly, and that the *Plague* takes away 2 or $\frac{2}{3}$ parts of the People as aforesaid; so as 73000 was probably the number of those that died of the *Plague* in one whole year at *Gran Cairo*, whereas at *London Anno* 1665, 97000 were brought to account to have died in that year. Wherefore it is certain, that that City wherein 97000 was but $\frac{1}{4}$ of the People, the number was greater than where 73000 was $\frac{2}{3}$ or the half. ||

We therefore conclude, that *London* hath more *People*, ¹² *Housing*, *Shipping* and *Wealth*, than *Paris* and *Rouen* put together; and for ought yet appears, is more considerable than any other City in the *Universe*, which was propounded to be proved. ||

P. J. d'Orleans's *History of the two Tartar Conquerors of China*, Hakluyt Soc., 1834, p. vii., also pp. 69—96, 103—131.

¹ In Hale's *Primitive Origination of Mankind*, 213, citing Leo's *History of Africa*. Such figures were frequently printed in the 17th century, e.g. Purchas, *Pilgrimes* (1625), p. 833.

A N
E S S A Y
I N
Political Arithmetick,
B Y
Sir WILLIAM PETTY,

Tending to prove that in the Hospital called *L'hostel Dieu* at *Paris*, there die above 3000 *per Annum* by reason of ill accommodation.

1. **I**T appears that *Anno* 1678 there entred into the Hospital of *La Charité* 2647 Souls, of which there
14 died there within the said year 338, which || is above an *eighth part* of the said 2647, and that in the same year there entred into *L'hostel Dieu* 21491, and that there died out of that number 5630, which is above *one quarter*, so as about half the said 5630, being 2815, seem to have died for want of as good usage and accommodation as might have been had at *La Charité*¹.

2. Moreover in the year 1679 there entred into *La Charité* 3118, of which there died 452, which is above a *seventh part*, and in the same year there entred into *L'hostel Dieu* 28635, of which there died 8397; and in both the said

¹ The source of this information is doubtless the Paris bills, which reported the deaths in each of the seventeen hospitals in the city and gave after 1671, a monthly *État de l'hotel dieu*, cf. Morand in *Histoire de l'Académie Royale des Sciences*, année 1771, pp. 832—842.

years 1678 and 1679 (being very different in their degrees of || Mortality) there entred into *L'hostel Dieu* 28635 and 15 21491, in all 50126, the Medium whereof is 25063, and there died out of the same in the said Two years 5630 & 8397, in all 14027, the Medium whereof is 7013.

3. There entred in the said years into *La Charité* 2647 and 3118, in all 5765, the Medium whereof is 2882, whereof there died 338 and 452, in all 790, the Medium whereof is 395.

4. Now if there died out of *L'hostel Dieu* 7013 *per annum*, and that the proportion of those that died out of *L'hostel Dieu* is double to those that died out of *La Charité* (as by the above || Numbers it appears to be near thereabouts) 16 then it follows that half the said Numbers of 7013 being 3506, did not die by *natural necessity*, but by the evil administration of that Hospital.

5. This Conclusion seem'd at the first sight very strange, and rather to be some mistake or chance than a solid and real truth, but considering the same matter as it appeared at *London*, we were more reconciled to the belief of it, *viz.*

1. In the Hospital of St. *Bartholomew* in *London* there was sent out and *cured* in the year 1685, 1764 Persons, and there *died* out of the said Hospital 252. || Moreover there 17 were sent out and *cured* out of St. *Thomas's* Hospital 1523, and *buried* 209, that is to say, there were cur'd in both Hospitals 3287, and buried out of both Hospitals 461, and consequently cured and buried 3748, of which number the 461 buried is less than an *eighth part*; whereas at *La Charité* the part that died was more than an *eighth part*; which shews that out of the most poor and wretched Hospitals of *London* there died fewer in proportion than out of the best in *Paris*.

2. Farthermore, it hath been above shewn that there died out of *La Charité* at a Medium 395 *per annum*, and 141 out of *Les* || *Incurables* making in all 536; and that out of 18 St. *Bartholomew's* and St. *Thomas's* Hospital, *London*, there died at a Medium but 461, of which *Les Incurables* are part; which shews that although there be more People in *London*

than in *Paris*, yet there went at *London* not so many People to Hospitals as there did at *Paris*, although the poorest Hospitals at *London*, were better than the best at *Paris*; which shews that the poorest People at *London* have better accommodation in their own houses, than the best Hospital of *Paris* affordeth.

6. Having proved that there die about 3506. Persons at *Paris* unnecessarily to the damage of *France*, || we come next to compute the value of the said damage and of the Remedy thereof, as follows, viz. the value of the said 3506 at 60 *li. Sterl. per head*, being about the value of *Argier Slaves*, (which is less than the intrinsic value of *People* at *Paris*) the whole loss of the Subjects of *France* in that Hospital seems to be 60 times 3506 *li. Sterl. per Annum*, viz. 210 thousand 360 *li. Sterl.* equivalent to about two Millions 524 Thous. 320 *French Livres*.

7. It hath appeared that there came into *L'hostel Dieu* at a Medium 25063 *per Annum*, or 2089 *per Mensem*, and that the whole stock of what remain'd in the || precedent
20 Months is at a Medium about 2108 (as may appear by the third Line of the Table N^o 5, which shall be shortly published)¹ viz. the Medium of Months is 2410 for the sickly year 1679, whereunto 1806, being added as the Medium of Months for the year 1678, makes 4216, the Medium whereof is the 2108 above mentioned; which number being added to the 2089 which entred each Month, makes 4197 for the Number of Sick which are supposed to be always in *L'hostel Dieu* one time with another.

8. Now if 60 *French Livres per Annum* for each of the
21 said 4197 sick Persons were added to || the present ordinary Expence of that Hospital (amounting to an addition of 251 Thousand 820 *Livres*) it seems that so many lives might be saved as are worth above ten times that sum, and this by doing a manifest deed of Charity to Mankind. ||

Memorandum, That *Anno* 1685, the Burials of *London* were 23222, and those of *Amsterdam* 6245; from whence,

¹ The table was not published.

and the difference of Air, 'tis probable that the People of *London* are quadruple to those of *Amsterdam*¹.

¹ In the *Philosophical Transactions* for July—September, 1686 (vol. xvi. no. 183, p. 152) appeared the following, unsigned :

“An Extract of two Essays in Political Arithmetick concerning the comparative Magnitudes, &c. of *London* and *Paris* by Sr. William Petty Knight, R.S.S.

The excellent Author of these two Essays, has in several former of the same Nature made it appear that Mathematical Reasoning, is not only applicable to Lines and Numbers, but affords the best means of Judging in all the concerns of humane Life. In the present he endeavours to prove *London*, as it now is, the most considerable City now in being, by shewing it much to exceed *Paris*, (which not only the French but foreigners have asserted to be the chief City of Europe), both in People, Housing, and Wealth. The first by comparing the Bills of Mortality, whereby he finds that the People of *London* are as many as those of *Paris* and *Rouen* put together. The second by comparing the number of Houses, which by the Chimney-Books are found above 80000 in *London*, whereas a great Author among the French, (who seldome faile to magnifie their own things), reckons but 50000 Houses in *Paris*. As to the third, to wit the Wealth, he conceives that there is yet a much greater disposition, there being no comparison between them for Trade, and besides a good argument drawn from the Law-Suites of both places, he concludes from the *Paris* bills of Mortality, that two 5ths of the People of *Paris* are so poor that they chuse rather to die in Hospitals, than lie sick at their own Charges; and that a third of the whole People of that City, die out of the most wretched Hospital of L'Hostel Dieu; whereas at *London* there dies scarce one in fiftie in our Hospitals. Hereupon in the second Essay, our Author extends his Charity to those poor wretches, shewing how by a reasonable expence, 3000 persons might be there saved per Annum, who die for want of good accomodation. The whole is so close writt, that it will not bear Epitomizing, wherefore I rather recommend it to the Curious who cannot but be satisfied therewith.

end.”



WINDSOR,

Sep. 21st 1686.

I do hereby License these *Ob-*
servations to be printed.

Sunderland P.



OBSERVATIONS
UPON THE
CITIES
OF
LONDON
AND
ROME.

By Sir *WILLIAM PETTY*,
Fellow of the Royal Society.

LONDON,
Printed for *Henry Mortlocke*, at the *Phœnix*, in
St. Paul's Church-Yard, and *J. Lloyd*, in the middle
Exchange next *Salisbury-House* in the *Strand*. 1687.

OBSERVATIONS
UPON THE
CITIES
OF
LONDON and ROME.

I. THAT before the year 1630, the Christnings at *London* exceeded the Burials of the same¹, but about the year 1655 they were scarce half; and now about two thirds². ||

2. Before the Restauration of Monarchy in *England*,² *Anno* 1660, the People of *Paris* were more than those of *London* and *Dublin* put together, whereas now, the People of *London* are more than those of *Paris* and *Rome*, or of *Paris* and *Rouen*³.

¹ According to Graunt's table (pp. 407—8), which was probably Petty's source of information, this assertion is far from correct. In the twenty-five years from 1604 to 1630 the burials exceeded the christenings in sixteen instances, or including the plague burials in nineteen instances.

² Year.	Burials.	Christenings.
1683	20,587	14,735
1684	23,202	14,702
1685	23,222	14,730

³ As late as 1672 Graunt thought *Paris* more than one-fifth, but less than one-fourth larger than *London* (pp. 424). Petty, however, includes parishes which Graunt excluded (pp. 423, 457), and this may account for his transference to 1660 of the time when *Paris* exceeded *London*.

3. *Anno* 1665 one fifth part of the then People of *London*, or 97 thousand died of the Plague¹, and in the next year 1666, 13 thousand Houses or one fifth part of all the Housing of *London* were burnt also.

4. At the Birth of *Christ*, old *Rome* was the greatest City of the World, and *London* the greatest || at the Coronation of King *James* the Second, and near 6 times as great as the present *Rome*, wherein are 119 thousand Souls besides *Jews*².

5. In the years of King *Charles* the Second his death, and King *James* the Second his Coronation (which were neither of them remarkable for extraordinary Sickliness or Healthfulness) the Burials did wonderfully agree, *viz.* *Anno* 1684, they were 23202, and *Anno* 1685 they were 23222, the *Medium* whereof is 23212. And the Christnings did very wonderfully agree also, having been *Anno* 1684, 14702, and *Anno* 1685, 14732, the *Medium* whereof is 14716³, which
4 consistence was || never seen before, the said number of 23212 Burials making the People of *London* to be 696360, at the rate of one Dying *per annum* out of 30.

6. Since the great Fire of *London*, *Anno* 1666 about 7 parts of 15 of the present vast City hath been new built, and is with its People increased near one half, and become equal to *Paris* and *Rome* put together, the one being the Seat of the great *French* Monarchy, and the other of the Papacy.

F I N I S.

¹ In 1665 97,306 died, but only 68,596 were returned of the plague.

² "A Rome il meurt plus de 3000 personnes par an parce qu'il y a plus de cent mil ames. l'année passée il y en avoit 119825 sans les Juifs qui sont pres de trent milles. On meurt moins a Rome parce qu'il n'y a pas d'enfants a proportion des autres Villes, et bien des gens y viennent demurer ayant passé le temps auquel on meurt d'avantage. la sobriete et le soin qu'on a de la sante fait qu'on y meurt moins qu'en une Ville ou on est debauché.".....Extract from a letter of H. Justel to the Royal Society, read 27 October, 1686; Royal Society's Letter Book, vol. x., p. 26.

³ 14716 should be 14717.



WHITE-HALL,

Feb. 18th, 168⁶.

Let this be printed.

Sunderland P.



FIVE ESSAYS

I N

Political Arithmetick,

V I Z.

- I. Objections from the City of *Rey* in *Persia*, and from Mons^r *Auzout*, against two former Essays, answered, and that *London* hath as many People as *Paris*, *Rome* and *Rouen* put together.
- II. A Comparison between *London* and *Paris* in 14 particulars.
- III. Proofs that at *London*, within its 134 Parishes named in the Bills of Mortality, there live about 696 thousand People.
- IV. An estimate of the People in *London*, *Paris*, *Amsterdam*, *Venice*, *Rome*, *Dublin*, *Bristoll* and *Rouen*, with several observations upon the same.
- V. Concerning *Holland* and the rest of the VII *United Provinces*.

By Sir *WILLIAM PETTY*,
Fellow of the Royal Society.

Invidiam augendo ulciscar.

L O N D O N,
Printed for *Henry Mortlock* at the *Phœnix* in
St. Paul's Church-yard. 1687.

NOTE ON THE "FIVE ESSAYS."

AT the session of the Royal Society 22 December, 1686, Petty produced a defence of the Two Essays. The defence was read and the author promised to lodge it with the Society¹. The 29th December he gave in two notes about the magnitude of London and Paris, which were ordered with his leave to be printed². The two notes were accordingly published in the *Philosophical Transactions* for November and December, 1686³ under the caption of A further Assertion of the Propositions concerning the Magnitude of London, etc.⁴ The first note is substantially identical with the first of the Five Essays as printed in 1687 and here reprinted—variations are indicated in the foot notes. The second note, reprinted on p. 537, is not unlike the theses of the Fourth Essay. At the next session of the Society, 5 January, 1687, Petty produced three more papers in answer to the objection of Mr. Auzout against his conclusion that London was greater than Paris and Rouen taken together. He permitted them to be read and it was ordered that Justel's pleasure should be known with regard to printing an extract of Auzout's letter with Petty's answers⁵. Justel sent the following interesting reply:

Vendredi au soir.

Ce billet est pour vous supplier Monsieur de ne vouloir pas mettre l'endroit de la lettre de Monsieur Auzout ou il parle de celui qui luy a dit qu'il n'y a que vingt quatre mil maisons parceque ceci leur nuirait a tous deux et on me reprocherait d'estre cause de leur malheur. on est si delicat en france que la moindre chose

¹ Birch, IV. 513.

² *Ibid.* 516.

³ Vol. XVI. no. 185, pp. 237—240.

⁴ Bibliography, 19.

⁵ Birch, IV. 517.

qu'on trove disadvantageuse au pays chocque les gens ou les rend suspects. il faut mettre qu'on a dit a Monsieur Auzout qu'il n'y avait que vingt quatre mil maisons sans nommer celuy qui luy a dit. Vous en pouuez deuiner la raison. J'attends ce plaisir la de votre bonte et suis Vostre tres humble et tres obeissant serviteur

Justel.

For Mr Edmond Halley to be left
with Mr Henry Hunt at Gresham
College in bishopgatestreet
London.

[Endorsed by Southwell.] Mr Justel's note read Jan. 26 1688¹.

Accordingly no extract from Auzout's letter was published with Petty's three papers.

The Five Essays were published in English and French on opposite pages, each version having its own pagination. The French, here omitted, is a fairly close translation of the English. They were reviewed in Leclerc's *Bibliothèque universelle et historique*, VIII. Mars, 1688.

¹ Royal Society's Letter Book JI, letter 110.

TO THE
KING'S
Most Excellent MAJESTY.

SIR,

YOUR Majesty having graciously accepted my two late Essays, about the Cities and Hospitals of *London* and *Paris*, as also my Observations on *Rome* and *Rouen*; I do (after six Months¹ waiting for what may be said against my several Doctrines, by the able men of *Europe*) humbly present Your Majesty with a few other Papers upon the same Subject, to strengthen, explain and enlarge the former; hoping by such real arguments, better to praise and magnifie Your Majesty, than by any other the most specious Words and Elogies that can be imagined by

Your Majesty's

Most humble, loyal

and obedient Subject,

William Petty.

¹ The *Two Essays* were licensed the 26 August, 1686, the *Five Essays* the 18 February, 1687.

The FIRST ESSAY. 1

IT could not be expected that an assertion of *London's* being bigger than *Paris* and *Rouen*, or than *Paris* and *Rome* put together, and bigger than any City of the World, should scape uncontradicted¹; and 'tis also expected, that I (if continuing in the² same persuasion) should make some reply to those contradictions. In order whereunto,

I begin with the ingenious Authour of the ³*Republiq des Lettres*⁴, who saith that *Rey* in *Persia* is far bigger than

¹ The fact that the *Two Essays* were published in French and that an "extract" of them appeared in the *Philosophical Transactions* may have contributed something, perhaps, to the attention which they attracted on the continent; their subject, however, doubtless had more to do with it. Pierre Bayle reviewed them in his *Nouvelles de la République des Lettres* for October, 1686 (p. 1144 ff., also in his *Oeuvres diverses*, pp. 661—662), and the Leipzig *Acta eruditiorum* for October, 1687, summarized his review in connection with its notice of Petty's *Further Assertion*. Bayle concludes, "On attend quelques autres Pieces considerables de M. le Chevalier Petty, qui apparemment se verra critiqué bientôt par quelque Savant de Paris." It seems that Bayle's conjecture must have been verified, for the 3rd November Justel communicated to the Royal Society that there was an answer published in France to Petty's essay on the comparison between London and Paris, and in the same month Petty was told by the King that his *Essays* were answering in France, and by several others that the mightiest hammers there were battering his poor anvil. Birch, IV. 500, Fitzmaurice, 285. I have found no trace of these replies, nor anything to indicate that they ever came into Petty's hands. (See "The Eighth Objection" in the *Treatise of Ireland*, post). Bayle's criticism, on the contrary, doubtless reached Petty in November, as the previous number of the *Nouvelles*, September, 1686, was received at the Royal Society 27 October, 1686. Birch, IV. 498.

² 1686, 'that.'

³ 1686, 'the *Nouvelles de la République*.'

⁴ Bayle, commenting on Petty's assertion that London was the largest city in the world, asks, "Mais que seroit-ce en comparaison de Rey, si tout ce que les Historiens de Perse en disent étoit véritable?" He then refers to his review of

² *London*, for that || in the sixth Century of Christianity (I suppose, *An.* 550 the middle of that Century) it had¹ 15000, or rather 44000 Moschees, or Mahometan Temples; to which I reply, that I hope this Objector is but in jest, for that *Mahomet* was not born till about the year 570, and had no Moschees till about 50 years after.

² In the next place I reply to the excellent Monsr. *Auzout*³ Letters from *Rome*, who is content that *London*, *Westminster* and *Southwark*, may have as many people as *Paris* and its Suburbs; and but faintly denieth, that all the Housing within the Bills, may have almost as many people as *Paris* and ||
³ *Rouen*, but saith that several Parishes inserted into these Bills, are distant from, and not contiguous with *London*, and that *Grant* so understood it⁴.

The Travels of Sir John Chardin into Persia and the East Indies (London: Moses Pitt, 1686, f°), in the same number of the *Nowvelles*. The passage of Chardin (p. 387), which Bayle translates, runs thus: "Opposite to this [Ech-mouil] are to be seen some footsteps of that famous City of Rey, the biggest city in *Asia*.....The Persian Histories report, that in the time of Calife Medybillabou-Mohamed-Darvanich, who liv'd in the ninth Age of Christianism the City of Rey was divided into 96 Quarters, of which every one contained 46 streets, and every Street 400 Houses and ten *Mosques*.....Arabian writers affirm in like manner, that in the third Age of Muhametism, which is exactly at the same time, that Rey was the best peopl'd City in *Asia*." This refers obviously to the ninth century, but Bayle summarizes "elle [la *Geographie Persane*] porte qu'au 6. siècle du Christianisme la Ville de Rey étoit divisée," etc. And it is exclusively against this chronological blunder, perhaps caused by a misprint, that Petty directs his answer to Bayle.

¹ 1686, 'An. 550, it had.'

² 1686: 'The next is the excellent *Monsieur Auzout* from *Rome*, who is content that *London*, *Westminster*, and *Southwark* with the contiguous Housing may have,' etc. The French version of 1687 has, 'Ensuite je repons aux lettres que l'excellent Mr. Auzout écrit de *Londres*.' In the 1699 edition "*Londres*" is altered to "*Rome*."

³ *Adrien Auzout*, astronomer, was born at *Rouen* early in the seventeenth century. He was one of the first members of the *Académie des Sciences*, but lost his seat through an intrigue and went to Italy, dying at *Rome* in 1691. *Auzout* was a frequent correspondent of the *Royal Society*. *Birch*, IV. 162, 301; *Philos. Trans.* no. 1, p. 3, no. 2, p. 18, no. 3, p. 36, no. 4, pp. 55, 56, 63, 68, 69, 74, no. 7, p. 120, no. 12, p. 203, no. 21, p. 373. His letter or letters here referred to are not preserved at the *Royal Society*, nor do I find any allusion to his letter of 19 November in *Justel's* letters. He may have addressed himself to *Petty* directly.

⁴ See p. 423.

To which (as his main if not his onely objection)¹ we answer: 1. That the *London* Bills appear in *Grant's Book*, to have been always since² the year 1636, as they now are. 2. That about 50 years since, 3 or 4 Parishes, formerly somewhat distant³ were joynd by interposed Buildings, to the Bulk of the City, and therefore then inserted into the Bills. 3. That since 50 years, the whole || buildings being more⁴ than double; have perfected that Union, so as there is no House within the said Bills, from which one may not call to some other House. 4. All this is confirmed by Authority of the King and City, and the Custome of 50 years⁴. 5. That there are but 3 Parishes under any colour of this Exception, which are scarce $\frac{1}{8}$ part of the whole.

Upon the whole matter, upon sight of Monsr. *Auzout's* large Letter, dated the 19th of November, from Rome, I made Remarques⁵ upon every Paragraph thereof; but suppressing it (because it lookt like a War against a worthy Per-||son with⁶ whom I intended none, whereas in truth it⁵ was but a reconciling explication of some doubts) I have chosen the shorter and softer⁷ way of answering Monsieur *Auzout* as followeth, *viz.* ||

Concerning the number of People in *London*, as also in 6 *Paris*, *Rouen* and *Rome*, *viz.*

Monsieur *Auzout* alledgeth an authentick Account⁸, that there are 23223 Houses in *Paris*, wherein do live about 80 thousand Families, and therefore supposing $3\frac{1}{2}$ Families to live in every of the said Houses, one with another, the number of Families will be 81280; and Monsr. *Auzout* also allowing 6 Heads to each Family⁹, the utmost } 487,680

¹ 1686, 'his main, if not only Objection.'

² 1686, 'to have been, since.'

³ 1686, 'formerly distant.'

⁴ 1686, 'and so long custom.' 'Of 50 years' was added in 1687.

⁵ 1686, 'Upon sight of Monsieur Auzouts large Letter, I made Remarques.'

⁶ 1686, 'against one with.'

⁷ 1686, 'sweeter.'

⁸ 1686, 'Register.'

⁹ Petty previously allowed eight heads to the tenanted house (p. 459) and later (p. 534), he assumed eight, ten or five according to social position.

number of People in <i>Paris</i> according to that opinion ¹ will be	
The Medium of the <i>Paris</i> Burials was not denied ² by Monsr. <i>Auzout</i> to be 19887, nor that ³ there died 3506 unnecessarily out of <i>L'Hotel-Dieu</i> ; wherefore deducting the said last Number out of the former, the neat ⁴ standard for Burials at <i>Paris</i> , will be 16381, so as the number of People there, allowing but one to die out of 30 (which is more advantageous to <i>Paris</i> than Monsr. <i>Auzout's</i> opinion of one to die out of 25) the number of People at <i>Paris</i> will be	} 491,430
8 491,430, more than by Monsr. <i>Auzout's</i> own last mentioned Account.	
And the Medium of the said 2 <i>Paris</i> acc ^{ts} is	} 488,055 ⁵
The Medium of the <i>London</i> Burials is really ⁶ 23212, which multiplied by 30 (as hath been done for <i>Paris</i>) the number of the People there will be	
9 The number of Houses at <i>London</i> appears by the Register to be 105,315, whereunto adding $\frac{1}{10}$ part of the same, or 10331 ⁷ , as the least number of double Families that can be supposed in <i>London</i> ,	} 695,076
the total of Families will be 115,840 ⁸ ; and allowing 6 heads for each Family as was done for <i>Paris</i> , the total of the People at <i>London</i> will be	
The Medium of the two last <i>London</i> Accounts is	} 695,718

¹ 1686, 'to M. Auzout's opinion.'

² 1686, 'was allowed by.'

³ 1686, 'and that.'

⁴ 1686, 'Number, the neat.'

⁵ 488,055 should be 489,555; this mistake, continued through the subsequent calculations, gives rise to errors that are mentioned in the notes. But accepting Petty's mistaken "medium of the said two Paris accounts," his calculations are correct.

⁶ "Really" apparently refers to Petty's previous use (p. 506) of 22,337 as the medium of London burials. He gets this new and higher medium by taking the years 1684 and 1685 only, instead of 1683—85, as in the *Two Essays*.

⁷ 1686, 'part or 10531.' The '10,331' of the 1687 edition is a misprint for 10,531.

⁸ 115,840 is a misprint for 115,846.

So as ¹ the People of <i>Paris</i> according	} 488,055 ³	} 10
to the above account ² , is		
Of <i>Rouen</i> according to Monsr. <i>Auzout's</i>	} 80,000	} 693,055 ⁴
utmost demands		
Of <i>Rome</i> according to his own report	} 125,000	}
thereof in a former Letter ⁵		
So as there are more People at <i>London</i> than at	} 2,663 ⁶	} 11
<i>Paris, Rouen</i> and <i>Rome</i> by		
<i>Memorandum</i> , That the Parishes of <i>Islington,</i>	} 114,284 ⁷	} 12
<i>Newington</i> and <i>Hackney</i> , for which onely there is		
any colour of Non-contiguity, is not $\frac{1}{8}$ part of		
what is contained in the Bills of Mortality, and		
consequently <i>London</i> , without the said 3 Parishes,		
hath ⁸ more People than <i>Paris</i> and <i>Rouen</i> put		
together, by		

⁹Which number of 114,284 is probably more People than any other City of *France* contains. ||

¹ 1686 omits 'So as.'

² 1686, 'the above-said Account.'

³ '488,055' should be 489,555.

⁴ '693,055' should be 694,555.

⁵ 1686 omits 'in a former letter,' which may imply that a second letter, making the first 'former,' was received from Auzout between the publication of this essay in the *Philos. Trans.* and its issue in book form.

⁶ '2663' should be 1163.

⁷ '114,284' should be 112,784.

⁸ 1686, 'without them, hath.'

⁹ 1686 omits the last paragraph 'Which...contains,' and concludes with the 'several other estimates' printed on p. 537.

AS for other Comparisons of *London* with *Paris*, we farther repeat and enlarge what hath been formerly said upon those matters, as followeth, *vis.*

1. That 40 *per Cent.* die out of the Hospitals at *Paris* where so many die unnecessarily, and scarce $\frac{1}{30}$ of that proportion out of the Hospitals of *London*, which have been shewn to be better than the best of *Paris*.

2. That at *Paris* 81280 Kitchens, are within less than 14 24000 || Street-doors¹, which makes less cleanly and convenient way of living than at *London*.

3. Where the number of Christnings are near unto, or exceed the Burials, the People are poorer, having few Servants and little Equipage,

4. The river of *Thames* is more pleasant and navigable than the *Seyne*, and its Waters better and more wholesome; and the Bridge of *London*, is the most considerable of all *Europe*.

5. The Shipping and foreign Trade of *London* is incomparably greater than that at *Paris* and *Rouen*. ||

15 6. The Lawyers Chambers at *London* have 2772 Chimnies in them, and are worth 140 thousand Pounds sterling, or 3 millions of French Livers, besides the dwellings of their Families elsewhere.

7. The Air is more wholesome, for that at *London* scarce 2 of 16 die out of the worst Hospitals, but at *Paris* above 2

¹ On the basis of one kitchen for each of Auzout's families and one street door for each of his 23,233 houses, see p. 527.

of 15 out of the best. Moreover the Burials of *Paris* are $\frac{1}{3}$ part above and below the Medium, but at *London* not above $\frac{1}{12}$, so as the intemperies of the Air at *Paris* is far greater than at *London*.

8. The Fuel cheaper, and lies in less room, the Coals being an || wholesome sulphurous bitumen. 16

9. All the most necessary sorts of Victuals, and of Fish, are cheaper, and Drinks of all sorts in greater variety and plenty.

10. The Churches of *London* we leave to be judg'd by thinking that nothing at *Paris* is so great as *St. Paul's* was, and is like to be, nor so beautifull as *Henry* the seventh's Chapel.

11. On the other hand, 'tis probable, that there is more Money in *Paris* than *London*, if the publick Revenue (grossly speaking, || quadruple to that of *England*) be lodged there. 17

12. *Paris* hath not been for these last 50 years so much infested with the Plague as *London*; now that at *London* the Plague (which between the year 1591 and 1666, made 5 returns, viz. every 15 years, at a Medium, and at each time carried away $\frac{1}{3}$ of the People) hath not been known for the 21 years last past, and there is a visible way by God's ordinary Blessing to lessen the same by $\frac{2}{3}$ when it next appeareth¹.

13. As to the Ground upon which *Paris* stands in respect of *London*, we say, that if there be 5 Stories || or Floors of 18 Housing at *Paris*, for 4 at *London*, or in that proportion, then the 82 thousand Families of *Paris* stand upon the equivalent of 65 thousand *London* Housteds, and if there be 115 thousand Families at *London*, and but 82 thousand at *Paris*, then the proportion of the *London* Ground to that of *Paris* is as 115 to 65, or as 23 to 13.

14. Moreover *Paris* is said to be an Oval of 3 English Miles long and $2\frac{1}{2}$ broad, the Area whereof contains but $5\frac{1}{2}$ square Miles; but *London* is 7 Miles long, and $1\frac{1}{4}$ broad at a Medium, which makes an Area of near 9 square Miles, which proportion of $5\frac{1}{2}$ to 9 differs little from that of 13 to 23. ||

¹ Probably an allusion to Petty's plan 'Of Lessening ye Plagues of London.' See *Verbum Sap.*, p. 109, note.

- 19 15. *Memorandum*, That in *Nero's* time, as Monsr. Chivreau reporteth¹, there died 300 thousand People of the Plague in Old *Rome*; Now if there died 3 of 10 then, and there, being a hotter Countrey, as there dies 2 of 10 at London, the number of People at that time, was but a million, whereas at London they are now about 700 thousand. Moreover the Ground within the Walls of Old *Rome* was a Circle but of 3 Miles diameter, whose Area is about 7 square Miles, and the Suburbs scarce as much more, in all about 13 square Miles, whereas the built Ground at London is about 9 square
 20 Miles as || aforesaid; which two sorts of proportions, agree with each other, and consequently Old *Rome* seems but to have been half as big again as the present London, which we offer to Antiquaries. ||

¹ Petty's use of Chevreau's estimate argues no knowledge of the *Histoire du Monde* (Paris, 1686, 2 v. 4^o) beyond what he might have drawn from Bayle's words, "Il s'étend beaucoup sur la magnificence de Rome.....Il croit qu'il s'y est trouvé près de quatre millions d'habitans, & il reporte que les trois cens mille personnes qui y moururent de peste en une Automne sous le regne de Neron, ne firent pas remarquer que le nombre des habitans fût devenu moindre. *République des Lettres*, Nov., 1686, *Oeuvres*, 1. 68o.

PROOFS that the number of People in the 134 Parishes of the *London* Bills of Mortality, without reference to other Cities, is about 696 thousand, *viz.*

I know but three ways of finding the same.

1. By the Houses, and Families, and Heads living in each.
2. By the number of Burials in healthfull times, and by the proportion of those that live, to those that die. ||
3. By the number of those who die of the Plague in ²² Pestilential years, in proportion to those that scape.

The First way.

To know the number of Houses I used three methods, *viz.*

1. The number of Houses which were burnt *Anno* 1666, which by authentick Report was 13200; next what proportion the People who dyed out of those Houses, bore to the whole; which I find *Anno* 1686, to be but $\frac{1}{4}$ part, but *Anno* 1666 to be almost $\frac{1}{8}$, from whence I infer the whole Housing of *London* || *Anno* 1666 to have been 66 thousand, then finding ²³ the Burials *Anno* 1666 to be to those of 1686 as 3 to 4, I pitch upon 88 thousand to be the number of Housing *Anno* 1686.

2. Those who have been employed in making the general Map¹ of *London*, set forth in the year 1682, told me that in

¹ Petty twice refers to a map of London "set forth in the year 1682" (see also p. 542), but no such map can be found at the British Museum. Mr C. H. Coote, of the Department of Maps, thinks it probable that the map which Petty used was Ogilby and Morgan's. This map was published with the title: *A large and*

that year, they had found above 84 thousand Houses to be in *London*, wherefore *Anno* 1686, or in 4 years more, there might be $\frac{1}{10}$ or 8400 Houses more (*London* doubling in 40 years) so as the whole, *Anno* 1686 might be 92400. ||

- 24 3. I found that *Anno* 1685, there were 29325 Harths in *Dublin*, and 6400 Houses, and in *London* 388 thousand Harths, whereby there must have been at that rate 87000 Houses in *London*. Moreover I found that in *Bristol* there were in the same year 16752 Harths, and 5307 Houses, and in *London* 388 thousand Harths as aforesaid; at which rate there must have been 123 thousand Houses in *London*, and at a Medium between *Dublin* and *Bristol* proportions 105 thousand Houses.

Lastly, By Certificate from the Harth-Office, I find the Houses within the Bills of Mortality to be 105,315. ||

- 25 Having thus found the Houses, I proceed next to the number of Families in them, and first I thought that if there were 3 or 4 Families or Kitchens in every House of *Paris*, there might be 2 Families in $\frac{1}{10}$ of the Housing of *London*; unto which supposition, the common opinion of several Friends, doth concur with my own conjectures.

- As to the number of Heads in each Family, I stick to *Grant's* observation in page ¹ of his fifth Edition, That in Tradesmen of *London's* Families, there be 8 Heads one with
26 another, in Families of higher Ranks, above 10, || and in the poorest near 5, according to which proportions, I had upon another occasion² pitch'd the medium of Heads in all the Families of *England* to be $6\frac{1}{2}$, but quitting the Fraction in this Case, I agree with Monsieur *Auzout* for 6.

accurate map of the city of London Ichnographically Describing all the Streets, Lanes, Alleys, Courts, Yards, Churches, Halls and Houses, &c. Actually Surveyed and Delineated By John Ogilby Esq.....dedicated and presented by...William Morgan, and was accompanied by a descriptive text entitled London Survey'd: or, an explanation of the large map of London. Giving a Particular Account Of the Streets and Lanes, in the City and Liberties. By John Ogilby & William Morgan, His Majesty's Cosmographers. London, Printed and Sold at the Authors House In White Fryers, 1677. So far as I can discover, neither the map nor the text makes any calculation of the population or of the houses of London.

¹ Page 82 of the fifth ed., p. 385 of this reprint.

² In some calculation now probably lost.

To conclude, the Houses of *London* being 105315, and the addition of double Families 10531 more, in all 115846; I multiplied the same by 6, which produced 695076 for the number of the People.

The Second way.

I found that the years 1684 and 1685, being next each other, and || both healthfull, did wonderfully agree in their ²⁷ Burials, *viz.* 1684 they were 23202, and *Anno* 1685 23222, the Medium whereof is 23212; Moreover that the Christnings 1684 were 14,702, and those *Anno* 1685 were 14730, wherefore I multiplied the Medium of Burials 23212 by 30, supposing that one dies out of 30 at *London*, which made the number of People 696,360 Souls¹.

Now to prove that one dies out of 30 at *London*, or thereabouts, I say,

1. That *Grant* in the ³ page of his fifth Edition, affirmeth from observation, that 3 died of 88 *per* || *an.* which ²⁸ is near the same proportion.

2. I found that out of healthfull places, and out of adult persons, there dies much fewer, as but 1 out of 50 among our Parliament men, and that the Kings of *England* having reigned 24 years one with another, probably lived above 30 years each.

3. *Grant*, page ³ hath shewn³ that but about 1 of 20 die *per an.* out of young Children under 10 years old, and Monsr. *Auzout* thinks that but 1 of 40 die at *Rome*, out of the greater proportion of adult persons there, wherefore we still stick at a Medium to the number 30. ||

4. In 9 Countrey Parishes lying in several parts of ²⁹ *England*, I find that but one of 37 hath died *per an.* or 311 out of 11507, wherefore till I see another round number,

¹ Cf. p. 506, where, by averaging more years, Petty gets a smaller population.

² Page 82 of the fifth ed., p. 385 of this reprint. *Graunt* says that 3 died out of 11 families and guesses that the families have, one with another, 8 members.

³ *Graunt* makes no such assertion. Petty's proposition appears to be a guess which may find some slight support on pp. 386—387 of *Graunt*.

grounded upon many observations, nearer than 30, I hope to have done pretty well in multiplying our Burials by 30, to find the number of the People, the product being 696,360, and what we find by the Families they are 695,076, as aforesaid.

The Third way.

It was prov'd by *Grant*¹, that $\frac{1}{3}$ of the People died of the
 30 Plague, but *Anno* 1665 there died of the || Plague near 98
 thousand persons², the Quintuple whereof is 490 thousand, as
 the number of People in the year 1665, whereunto adding
 above $\frac{1}{3}$, as the increase between 1665 and 1686, the total is
 653 thousand, agreeing well enough with the other two
 Computations above mentioned.

Wherefore let the proportion of 1 to 30 continue till a
 better be put in its place.

Memorandum, That 2 or 3 hundred new Houses would
 make a Contiguity of 2 or 3 other great Parishes, with the
 134 already mentioned in the Bills of Mortality; and that an
 oval Wall of about 20 Miles in compass would enclose the ||
 31 same, and all the Shipping at *Deptford* and *Black-wall*, and
 would also fence in 20 thousand Acres of Land, and lay the
 foundation or designation of several vast advantages to the
 Owners, and Inhabitants of that Ground, as also to the whole
 Nation and Government. ||

¹ *Graunt* does not say this.

² In 1665 there died in all 97,306, whereof 68,596 of the plague. On this basis, *Petty's* method would give a population of about 460,000 in 1686, agreeing ill enough with the other two computations above mentioned.

The FOURTH ESSAY¹.

32

*Concerning the proportions of People in the 8 eminent
Cities of Christendom undernamed, viz.*

I. **W**E have by the number of Burials in healthfull years, and by the proportion of the living to those who die yearly, as also by the number of Houses and Families within the 134 Parishes, called *London*, and the estimate of the Heads in each, pitch'd upon the number of People in that City to be at a Medium 695718. ||

2. We have, by allowing that at *Paris* above 80 thousand 33 Families (*viz.* 81280) do live in 23223 Houses, 32 Palaces, and 38 Colleges, or that there are 81,280 Kitchens within less than 24 thousand Street-dores; as also by allowing 30 Heads for every one that died necessarily there; we have pitch'd upon the number of People there at a Medium to be 488055, nor have we restrained them to 300 thousand, by allowing with Monsr. *Auzout* 6 Heads for each of *Morery's* 50 thousand Houses or Families.

¹ This essay is outlined in the "Several other Estimates" which Petty appended to the earliest publication of the *First Essay* (p. 522) *viz.*

- I. That *London* alone is equal to *Paris*, *Roven*, and *Rome*, as aforesaid.
- II. That *London*, *Bristol*, and *Dublin* are equal to *Paris*, *Amsterdam*, and *Venice*.
- III. That *London* alone is to *Amsterdam*, *Venice*, and *Roven* as 7 to 4.
- IV. That *London* and *Bristol* are equal to any four Cities of *France*.
- V. That *Dublin* is probably equal to the second best City, of any Kingdom or State in Christendome.
- VI. That *London*, for ought appears, is the greatest City of the World, but manifestly the greatest *Emporium*.

3. To *Amsterdam* we allow 187350 Souls, viz. 30 times the number of their Burials, which were 6245 in the year 1685. ||

34 4. To *Venice* we allow 134 thousand Souls, as found there in a special account taken by authority, about 10 years since, when the City abounded with such as returned from *Candia*, then surrendered to the *Turks*¹.

5. To *Rome* we allow 119 thousand Christians and 6000 Jews, in all 125 thousand Souls, according to an account sent hither of the same by Monsr. *Auzout*².

6. To *Dublin* we allow (as to *Amsterdam*) 30 times its Burials, the Medium whereof for the last 2 years is 2303, viz. 69090 Souls. ||

35 7. As for *Bristol*, we say that if the 6400 Houses of *Dublin*, give 69,090 People, that the 5307 Houses of *Bristol*, must give above 56 thousand People; Moreover, if the 29325 Harths of *Dublin* give 69,090 People, the 16,752 Harths of *Bristol*, must give about 40 thousand; but the Medium of 56 thousand and 40 thousand is 48 thousand..

8. As for *Rouen*, we have no help, but Monsr. *Auzout's* fancy of 80 thousand Souls to be in that City, and the conjecture of knowing Men that *Rouen* is between the $\frac{1}{4}$ and $\frac{1}{8}$ part of *Paris*, and also that it is by a third bigger than 36 *Bristol*; By all which, we estimate || (till farther light) that *Rouen* hath at most but 66 thousand People in it.

Now it may be wondred why we mentioned *Rouen* at all,

¹ In the Commonplace book of Petty's friend Dr Ent at the Royal Society (MSS. vol. 83) is a memorandum (pp. 78—79) of the number of inhabitants of Venice. The classes enumerated are noblemen, merchants, servants, artificers, beggars, friars, nuns, priests, poor in hospitals, Jews. In most cases they are distinguished as male and female, and the number of their children, male and female, is also given. The total is 134,801. If Petty's authority be, as seems not improbable, the same as that used by Ent, the chronology is confused. He was writing in 1686 or 1687. *Candia* surrendered nearly 20 years before, the special account is said by Ent to have been taken more than 20 years before the surrender, and Yriarte appears to assign it to the year 1582. *La vie d'un patricien de Venise*, p. 72. Unfortunately I have no present access to such authoritative books as might determine the question. *The Present State of Venice*, by J. Gailhard (1669) says that the city contains above 300,000 souls.

² See p. 529, and note 5.

having had so little knowledge of it; Whereunto we answer, that we did not think it just to compare *London* with *Paris*, as to Shipping and foreign Trade, without adding *Rouen* thereunto, *Rouen* being to *Paris* as that part of *London* which is below the Bridge, is to what is above it.

All which we heartily submit to the correction of the Curious and || Candid, in the mean time observing according 37 to the Gross numbers undermentioned.

	m.
<i>London</i>	696
<i>Paris</i>	488
<i>Amsterdam</i>	187
<i>Venice</i>	134
<i>Rome</i>	125
<i>Dublin</i>	69
<i>Bristoll</i>	48
<i>Rouen</i>	66

Observations on the said 8 Cities.

38

	m.
1. That the People of <i>Paris</i> being	488
of <i>Rome</i>	125
of <i>Rouen</i>	66
do make in all but	679

thousand, or 17 thousand less than the 696 thousand of *London* alone.

2. That the People of the 2 English Cities and Em-poriums, viz. of *London* 696 thousand, and *Bristol* 48 thousand, do make 744 thousand, or more than

	m.
In <i>Paris</i>	488
<i>Amsterdam</i>	187
<i>Rouen</i>	66
Being in all	741

39 3. That the same 2 English Cities seem equivalent

To <i>Paris</i> , which hath 488 thous. Souls.	
To <i>Rouen</i>	66
To <i>Lyons</i>	100
To <i>Thoulose</i>	<u>90</u>
In all	744

If there be any Errour in these Conjectures concerning these Cities of *France*, we hope they will be mended by those whom we hear to be now at work upon that matter¹. ||

40 4. That the King of *England's* 3 Cities, *viz.*

	m.			m.	
<i>London</i>	696	} exceed	{	<i>Paris</i>	488
<i>Dublin</i>	69			<i>Amsterdam</i>	187
<i>Bristoll</i>	<u>48</u>			<i>Venice</i>	<u>134</u>
in all	813		being but	809	

5. That of the 4 great Emporiums, *London*, *Amsterdam*, *Venice* and *Rouen*, *London* alone is near double to the other 3, *viz.* above 7 to 4.

	m.		
<i>Amsterdam</i>	187	} m.	
<i>Venice</i>	134		387
<i>Rouen</i>	<u>66</u>		2
	774		<i>Lond.</i> 696 m.

41 6. That *London* (for ought appears) is the greatest and most considerable City of the World, but manifestly the greatest Emporium.

When these Assertions have past the *Examen* of the Critiques, we shall make another Essay, shewing how to apply those Truths to the Honour and Profit of the King and Kingdom of *England*². ||

¹ See p. 525, note.

² Failing health and interest in his *Treatise of Ireland*, printed in this volume, probably prevented Petty from writing the promised essay.

The FIFTH ESSAY.

42

*Concerning Holland and the rest of the United
Provinces.*

Since the close of this Paper, it hath been objected from *Holland*, That what hath been said of the number of Houses and People in *London* is not like to be true; for that if it were, then *London* would be the $\frac{3}{8}$ of the whole Province of *Holland*. To which is answered, That *London* is the $\frac{3}{8}$ of all *Holland* and more, that Province having not a Million and 44 thousand Inhabitants (whereof 696 m. is the $\frac{3}{8}$) nor above 800 || thousand, as we have credibly and often heard; ⁴³ for suppose *Amsterdam* hath, as we have elsewhere noted¹ 187 thousand, the seven next great Cities at 30 thousand each one with another 210 thousand, the 10 next at 15 thousand each 150 thousand, the 10 smallest at 6 thousand each 60 thousand, in all the 28 walled Cities and Towns of *Holland* 607 thousand, in the Dorps and Villages 193 thousand, which is about one Head for every 4 Acres of Land; whereas in *England* there is 8 Acres for every Head, without the Cities and Market Towns.

Now, suppose *London* having 116 thousand Families, should have 7 Heads in each, the medium between Monsr. *Auzout* and *Grant's* || reckonings, the total of the People ⁴⁴ would be 812 thousand, or if we reckon that there dies one out of 34 (the Medium between 30 and 37 above mentioned²) the total of the People would be 34 times 23212, *vis.* 789208,

¹ See p. 538.

² See pp. 535—536.

the Medium between which number, and the above 812 thousand is 800604, somewhat exceeding 800 thousand, the supposed number of *Holland*¹.

Farthermore, I say that upon former searches into the Peopling of the World, I never found that in any Country (not in *China* it self) there was more than one Man to every English Acre of Land (many Territories passing for well
 45 peopled, where there is but one Man for ten || such acres) I found by measuring *Holland* and *West-Frizia, alias North-Holland*, upon the best Maps, that it contained but as many such Acres as *London* doth of People, *viz.* about 696 thousand Acres; I therefore venture to pronounce (till better informed) That the People of *London* are as many as those of *Holland*, or at least above $\frac{2}{3}$ of the same; which is enough to disable the Objection above mentioned; nor is there any need to strain up *London* from 696 thousand to 800 thousand, though competent reasons have been given to that purpose, and though the Authour of the excellent Map of *London*, set forth *Anno* 1682. reckoned the People thereof (as by the said
 46 Map² appears) to be 1200 || thousand, even when he thought the Houses of the same to be but 85 thousand.

The worthy person who makes this objection in the same Letter also saith,

¹ The *Aanwysing der heilsame politike Gronden en Maximen van de Republike van Holland en West-Vriesland*, Leyden, 1669, frequently attributed to De Witt, but written chiefly by Pieter de la Court, gives the return of a "very strict and severe" poll tax in 1662. There were then found but 481,934 persons in South Holland, and supposing West Friesland might yield a fourth part as many, the total population would have been 602,417. "But because possibly none but intelligent Readers, and such as have travelled, will believe, what we see is customary in all Places, that the number of people in all Populous Countries is excessively magnified, and that the Common Readers will think, that since many would be willing to evade the Poll Tax, there was an extraordinary Fraud in the Number given in: I shall therefore follow the common Opinion, and conclude, that the Number of People was indeed much greater, and that these Countries are since that time much improved in the Number of Inhabitants; and accordingly I shall give a guess as by vulgar Report, that the whole Number, without excluding any Inhabitants whatsoever, may amount to two Millions and four hundred thousand People." P. 40—41 of the Engl. Transl., *The True Interest of Holland*, 1702.

² See p. 533, note.

1. That the Province of *Holland*, hath as many People as the other 6 United Provinces together, and as the whole Kingdom of *England*, and double to the City of *Paris* and its Suburbs; that is to say, 2 millions of Souls¹. 2. He says that in *London* and *Amsterdam*, and other trading Cities, there are 10 Heads to every Family, and that in *Amsterdam* there are not 22 thousand Families. 3. He excepteth against the Register alledged by Monsr. *Auzout*, which || makes 47 23223 Houses and above 80 thousand Families to be in *Paris*, as also against the Register alledged by *Petty*, making 105315 Houses to be in *London*, with a tenth part of the same to be of Families more than Houses, and probably will except against the Register of 1163² Houses to be in all *England*, that number giving at 6 $\frac{1}{3}$ Heads to each Family, about 7 millions of People, upon all which we remark as followeth, *viz.*

1. That if *Paris* doth contain but 488 thousand Souls, that then all *Holland* containeth but the double of that number, or 976 thousand, wherefore *London* containing 696 thousand Souls, hath above $\frac{3}{4}$ of all *Holland* by 46 thousand. ||

2. If *Paris* containeth half as many People as there are 48 in all *England*, it must contain 3 millions and a half of Souls, or above 7 times 488 thousand, and because there do not die 20 thousand *per an.* out of *Paris*, there must die but one out of 175, whereas Monsr. *Auzout* thinks that there dies one out of 25, and there must live 149 Heads in every House of *Paris* mentioned in the Register, but there must be scarce 2 Heads in every House of *England*, all which we think fit to be reconsidered.

I must as an English Man take notice of one point more, which is, || that these Assertions do reflect upon the Empire 49 of *England*, for that it is said, that *England* hath but 2 millions of Inhabitants, and it might as well have been added, that *Scotland* and *Ireland*, with the Islands of *Man*,

¹ Van Beuningen (1622—1693), Dutch ambassador in London, was in the habit of asserting that all England had not more than two million inhabitants, and that the Netherlands were equally populous. De Leti, *Del teatro britannico*, 75.

² '1,163' is a misprint for 1,163,000; the French version speaks of "le registre de 1163 m. maisons en toute l'Angleterre."

Fearsey and *Gearnsey* have but $\frac{3}{4}$ of the same number, or 800 thousand more, or that all the King of *England's* Subjects in *Europe* are but 2 millions and 800 thousand Souls, whereas he saith, that the Subjects of the 7 United Provinces are 4 Millions. To which we answer, That the Subjects of the said 7 Provinces, are by this Objectour's own shewing, but the Quadruple of *Paris*, or 1932 thousand¹ Souls, *Paris* containing but 488000, as afore hath been prov'd, and we do
 50 here affirm that *England* || hath 7 millions of People, and that *Scotland*, *Ireland*, with the Islands of *Man*, *Fearsey* and *Gearnsey*, hath $\frac{3}{4}$ of the said number, or 2 millions 800 thousand more, in all 9 millions 800 thousand; whereas by the Objectour's doctrine, if the 7 Provinces have 1932 thousand People, the King of *England's* Territories should have but $\frac{7}{10}$ of the same number, viz. 1351 thousand whereas we say 9800 thousand, as aforesaid, which difference is so gross as that it deserves to be thus reflected upon.

To conclude, we expect from the concerned Critiques of the World, that they would prove, ||

51 1. That *Holland* and *West-Frizia*, and the 28 Towns and Cities thereof, hath more People than *London* alone.

2. That any 3 the best Cities of *France*, any 2 of all Christendom, or any one of the World, hath the same, or better Housing, and more foreign Trade than *London*, even in the year that King *James* the Second came to the Empire thereof.

THE END.

¹ Really 1,952,000.

A TREATISE OF IRELAND, 1687.

THE ELEMENTS OF IRELAND; AND OF ITS Religion, Trade & Policy.

By Sir *WILLIAM PETTY*, Fellow of the
Royal Society.

Ut parère Greges, Armenta, atque Arva, Colono ;
Ut variæ Gentes Uniri fœdere certo
Possint: Edoceo, Ponique Horrentia Martis
Arma. Favete, precor dij qui posuistis et illa !
Surgite jam, Superi! Vastisque incumbite Cœptis !
Ut Populi coëant; Quingentos qui, suprâ et, Annos
Discrepuère? Unum et fiant tua Regna, JACOBÈ.

[Now first printed from Additional MS. 21,128 in The British Museum.]

NOTE ON THE "TREATISE OF IRELAND."

v THE Treatise of Ireland, the last considerable product of Petty's pen, can be understood only by reference to his relations with James II. and to the purpose for which the Treatise was written. In Petty's experiments in ship-building and in his writings upon naval matters, James, as Lord High Admiral, had taken a lively interest. After his accession to the throne, he appears to have continued to repose confidence in Petty, granting him repeated interviews¹ and encouraging his scheme for a royal statistical office. Petty thereupon fancied that his ideas concerning the management of Irish affairs would have weight with the King. At the same time his growing realization of the dangers involved in Tyrconnel's violent Catholic policy supplied him with a further motive for submitting to James those "political pastimes and paradoxes concerning a perpetual peace and settlement of Ireland" which had long occupied his attention. He accordingly embodied his ideas in A Treatise of Ireland, designed both to convey a warning lest the importance of the Protestant interest in that island be underestimated, and also to propose a plan for the final solution of the perennial Irish Question.

The date of the Treatise can be determined within a few weeks. It was completed after Petty had received the returns of the Irish customs for the midsummer quarter, 1687², and it was ready for presentation to the King by the first week in September³.

¹ Fitzmaurice, 275-284, Clarendon to Rochester, 17 Nov., 1686, *Correspondence*, II. 67.

² See p. 588.

³

Sunday 4 [Sept.] this Evening.

S^r

I am just now sent to from Bath where The King will be on Tuesday for y^e papers in your hands. I blush to presse you for your perusall of them, & to make your Remarques with that frendly Severity you promised. As for y^e Truth in Matter of fact & y^e justnesse of my Inferences I am content to venture them at y^e perill of my Veracity & Reputation. But Whether The King will be

King James promptly appointed Petty's friend and admirer Pepys to examine the Treatise¹, but no steps were taken to execute its suggestions, and it was not even printed. The approach of the fatal disease of which Petty died three months later may well have prevented him from publishing the book himself, and when, in the years closely following the Revolution, the Political Arithmetick, the Political Anatomy of Ireland, and the Treatise of Naval Philosophy were finally printed, considerations of political expediency may have conspired with those based on the comparatively unfinished condition of the Treatise to deter his friends from giving it also to the world.

The Treatise is here reprinted from the Southwell or Nelligan MS.² whose history has been already traced³. Of that MS. it occupies folios 52—129, neatly written in a hand similar to that of the Southwell Political Arithmetick and corrected at a few points by Petty himself.

pleasd to have those Matters to be discussd & published, is beyond my Reach, Those onely can advise me who converse much with him: I am sure I meene well, but that may not be enough for

Your affctte and humble serv^t

Wm. Petty.

Autograph letter, endorsed, "Sept^r 4th, 1687. S^r W^m Petty to M^r Pepys. Upon his Political Papers & Calculacions relateing to Ireland, & y^e Improvement thereof." Rawlinson MS. A. 189, f. 17, Bodleian Library.

Piccadilly 8^o Septemb. 87.

¹ S^r

In my owne Judgement & Conscience, there is Nothing in our Treatise, Not true, not necessary to be considered, & not fitt for y^e Kings knowledge, &c. I therefore thanke God, That His Ma^{ty} appointed you to examine these my Opinions. In which take any Assistance you please whom The King will agre to. 2. The Matters pretend good to all y^e Kings Subjects & y^e Meanes propounded are of an high Extraordinary Nature, & therefore should be exposd to public View; but for this I am not peremptory for y^e whole. 1. If you cannot understand them alone, They are not fitt for y^e public but must be made plainer: Neverthesse, I will attend yo^r Summons to facilitate this Worke, by saving you y^e labor, of turning back to things already provid. I can say no more, but that I am

Yo^r most affectionat humble Servant

Wm Petty.

I have not broke yo^r seale.

Autograph letter, endorsed, "Sept^r 8th 1687. S^r W^m Petty to M^r Pepys. Accompanying a 2^d time his political Papers ab^t Ireland for a review." Rawlinson MS. A 189, f. 19, Bodleian Library.

² Brit. Mus. Addl. MS. 21,128.

³ P. 236, cf. p. 123.

The Contents of the Treatise as given by the MS. are so confused that a hint as to its essential structure may be acceptable. It propounds "a perpetual peace and settlement of Ireland, with the natural union of both kingdoms and peoples." The means for effecting this end are explained in nine chapters, together with an appendix containing eight objections, which the author answers seriatim. The first chapter puts forth six propositions, the execution of which would bring about the settlement of Ireland. The feasibility of these propositions Petty undertakes to demonstrate. The second chapter contains, in twenty postulates, the existing "state of the case reduced to terms of number, weight and measure." In the six following chapters the six propositions of chapter one are taken up in turn, and each is established—to the satisfaction of the author at least—by reference to one or more of the twenty postulates of chapter two. The ninth chapter recapitulates the whole argument. In the MS. this chapter is followed by Another View of the same Matters by the Way of a Dialogue between A and B. In fact, however, the discussion in this Dialogue refers to other matters than those discussed in the Treatise, while the following Objections refer to the Treatise exclusively. The insertion of the Dialogue between the Treatise and the Objections thus breaks the formal continuity of Petty's argument. I have accordingly treated the Dialogue as a separate essay, printing it, as Petty's Contents directs, after the Objections instead of before them.

In May, 1865, Mr W. H. Hardinge submitted to the Royal Irish Academy an account of An unpublished Essay on Ireland by Sir William Petty¹, then in the collection of the Marquis of Lansdowne. It is evident from Mr Hardinge's quotations that the unpublished essay was, in part at least, identical with the present Treatise. Inasmuch, however, as the Lansdowne MS. had but twenty-nine "pages" (size not specified), while the Southwell copy of the Treatise, including the Dialogue, extends to seventy-seven folio leaves rather closely written upon both sides, it is improbable that the Lansdowne MS. contained all that is here printed. It is impossible, however, to be certain in respect of this matter, as Lord Edmond Fitzmaurice, Petty's descendant and biographer, kindly informs me that the MS. which Mr Hardinge saw cannot now be found.

¹ *Trans. R.I.A.*, vol. xxiv, Antiquities, p. 371—377.

An Essay in Political Arithmetick concerning Ireland¹.

Tending to shew

1. The Political Anatomy of that Kingdom.
2. The Commotions and Bruileries, that Happen'd there from *Anno* 1641, to *Anno* 1666.
3. The Foreign Trade of that Nation *Anno* 1685.
4. The Proportion between the English and Irish both in Number and Weight.
5. Several Decays in Ireland between the year 83 & 87.
6. The Waxing and Waning of the King's Revenue there, in the said Five Years, with the Causes thereof.
7. That Estates in Ireland may be Improv'd from Two to Three, with a Perpetual Settlement of the same, and Rooting up all the Causes of Discords, which have infested that Country for above 500 Years.
8. That therewith the Revenue of the Church of England, & of particular Landlords, there may be increased from 3 to 4.
9. And the King's Revenue from 4 to 5 without being a sensible Burden to the People; so as the King may have Six millions for every 4th. Year, supposed to be Warr.

¹ This syllabus shews rather what Petty intended than what he accomplished. The *Treatise* attempts to establish but eleven of the thirteen points. To the thirteenth it pays slight attention incidentally, of the twelfth it barely makes mention.

10. How Fears and Jealousies concerning Religion, &¹ even the Test, may vanish of themselves.

11. How the King's Subjects may be doubled in 20 Years, & also United.

12. That the King of England's Territories and People may in Weight and Substance be little inferior to those of France, by a safe and sufficient Liberty of Conscience perpetuated.

13. That there may be a real *Mare Clausum* begun in Ireland; and that the King has a more Natural Right to Sovereignty within the same, than any of his circumjacent Neighbors.

¹ '&' inserted by Petty.

The Contents of a Treatise, concerning *Ireland.*

1. *It propounds a perpetual Settlement of Ireland, with a Natural Improvement and Union of England and Ireland, by Transplanting a Million of People (without Distinction of Parties) out of Ireland into England: Leaving in Ireland onely enough Hands to manage as many Cattle as that Countrey will feed.* [Preface, p. 555.]
2. *Against which it is Objected, That the Costs and Losses of the said Transplantation, and Cattle Trade, will be 4 Millions of Money. In Answer to which* [Preface, p. 555.]
3. *The said Grand Proposal is divided into Six Points; and each of them Explain'd.* [Chapter I., p. 557.]
4. *There are Twenty Assertions and Suppositions, express'd in Terms of Number, Weight and Measure; by which the said Six Points are Discussed. Vizt.* [Chapter II., p. 558.]

1. *How the People of England and Ireland do now stand mix'd, as to their Proportions between Catholiks and others; and how the same will be, after the above Transplantations: With Motives to all Persons and Parties to comply therewith.* [Chapter III., p. 560.]
2. *That the Lands of England will be better'd by 70 Millions Sterling, or a Third Part.* [Chapter IV., p. 563.]
3. *That England will gain by Ireland 1500 M L per Ann. and as much as it gaineth by all the World besides.* [Chapter V., p. 566.]
4. *That the real and personal Estate of Ireland will rise from 2 to 3.* [Chapter VI., p. 567.]
5. *That the Revenues of the Church of England will rise from 3 to 4; and the King's from 4 to 5: Besides an Addition of 100 m pound per Ann. for extraordinary Church Uses.* [Chapter VII., p. 568.]
6. *That the Causes of Discord, which have continued in Ireland above 500 Years, arising from the Difference of Names, Births, Extractions, Language, Customes, Habits, and Religion, will all cease and vanish.*

An Estate shall be so settled, as to be coined into better Money, than that of Gold and Silver. [Chapter VIII., p. 570.]

7. *A Repetition and Enlargement of the Premises.* [Chapter IX., p. 571.]

Objections.

1. *That the said Transplantation is impracticable and Utopian.* [p. 574.]
2. *The said Cattle-Trade is so likewise.* [p. 575.]
3. *That Men will comply with neither, altho' practicable and profitable, out of mere Caprice and Perverseness.* [p. 576.]
4. *That the Irish will Hate and Scorn the said Transplantation, as the Abolishment of their Nation; which they will not think compensable by all the Advantages abovementioned.* [p. 577.]
5. *The Protestants of England will be frighted to see the Proportion between Catholicks and themselves, which is now, as 280 to one, shrink to 9 for one.* [p. 578.]
6. *There wants an indifferent Judicature, or natural Justice, to make the Estates of Ireland, as firm as is propounded.* [p. 580.]
7. *That these extraordinary Proposals of Transplantation, Cattle, Trade, and Judicature, are unnecessary: For that matters are already so well in Ireland without them.* [p. 582.]

Upon which Account the following Particulars are sett down. Vist.

1. *The Difference of the Price of Lands 1687, from what they were, 1683.* [p. 582.]
2. *The like Difference in Value of Houses, in Cities, Ports and Market-Towns.* [p. 583.]
3. *The like in Cattle of all Sorts.* [p. 583.]
4. *How much the People of Ireland have spent in the Years 1684, 1685, and 1686, in Drinks, and other Superfluities, above the Level of the precedent Years.* [p. 583.]
5. *The Value of Merchandise exported in the Years 1685, and 1686, without Return.* [p. 583.]
6. *An Estimate of the Moneys, Plate and other fine Goods and Furniture; which were, in the said 2 Years, conveyed out of Ireland, or other ways withdrawn from Currant Uses.* [p. 583.]
7. *How much the Catholicks of Ireland have Gained and how much they have Lost, by the Transactions of the said Two Years.* [p. 590.]
8. *What Effect the said Differences must have upon the Expense of the People, and upon such Branches of the King's Revenue, as depend thereon.* [p. 589.]

9. *That the Fall of Excise in the Year 1687, is not caused by the present Army's being Irish.* [p. 589.]
10. *A Computation of the different Values of the English and Irish, as to their Persons, and Personal Estates.* [p. 592.]
11. *The Causes of some Decays in Ireland, distinctly and respectively charged both upon the English and Irish.* [p. 593.]
12. *The State of Foreign Trade Anno 1685, with what Share each of both Parties had therein.* [p. 594.]
13. *The Causes of several Fears and Jealousies in Ireland.* [p. 596.]
14. *The Fear of Unsettlement of Land-Estates in Ireland may be, that the Acts of Settlement and Explanation were not grounded upon the several Accounts here enumerated.* [p. 597.]
15. *Several Conclusions drawn from the said Accounts.* [p. 598.]
16. *That Partiality in Justice is another Cause of Fears, with an exact Account of the Lord Dunsany's Wrongs and Relief.* [p. 602.]

The 8th Objection.

- [8]. *That all the abovesaid Proposals are uncouth, wild, Monstrous, and Chymical.* [p. 603.]
- To which is answer'd, that if the said Proposals do not please, because they seem to wast and dispeople Ireland: Another is put, of a quite contrary Nature, in the Room of it; Tending to people not onely Ireland, but all his Majesty's Kingdoms fully, and to double their present Number, within 25 years.* [p. 603.]

Memorandum.

That the Grand Judicature and Council above-mentioned, will be of Use not onely to adjudge Controversies as aforesaid, and manage the Transplantation or Increase of People here propounded; but also to perpetuate and improve the Liberty of Conscience lately granted by his Majestie.

Mention of another Essay, to shew that the King of England's Subjects and Territories are little inferior to those of France.

A Series of Matters relating to the Forfeitures of Ireland; with a Dialogue concerning the same. [p. 606.]

TO THE
KING'S

Most Excellent MAJESTIE.

When I find out puzzling and preplex Matters, that may be brought to Terms of Number, Weight and Measure, and consequently be made demonstrable; And when I find Things of vast and general Concernment, which may be discuss'd in a few Words: I willingly ingage upon such Undertakings, especially when they tend to your Majesty's Glory and Greatness, and the Happiness of your People, being one of them myself, and

Your Majesty's most Faithful
and Obedient Subject

Wm. Petty.

P R E F A C E.

SOME have Imagined, there being about 1300 Thousand People¹ in Ireland, that to bring a Million of them into England, and to leave the other 300 Thousand for Herdsmen and Dairy-Women behind, and to quit all other Trades in Ireland, but that of Cattle onely, would effect the Settlement, Improvement, and Union, above propounded.

But against this Method there lyes this gross and obvious Objection, vizt. That the Transporting of a Million of People, will cost a Million of Pounds; That the Housing, and other Goods in Ireland, which will be lost hereby, are worth Two Millions more: Nor is it safe to Estimate other Damages and Expenses, consequent to this Undertaking, at less than one Million more; in all at 4 Millions of Expence and Damage. To which Objection there is a Gross Answer: which is, That by Bringing a Million of People into England, where are 7 already, the King's Revenue of Customs, Excise, and Hearths, will rise from 7 to 8, that is, to 200 Thousand Pounds per Ann. more then at present²:—which Increase, at 20 Years Purchase, is above 4 Millions, and more than the Loss above-mentioned. Now where the King's Revenue, shall Naturally and Spontaneously increase, it is rationally to be suppos'd,

¹ Petty had calculated the population of Ireland at 1,100,000 in 1672 and at "about 1200 Thousand" in 1676. *Polit. Anat.*, p. 141, and note on p. 142, *Polit. Arith.*, p. 272.

² 'then at present' inserted by Petty.

That the People's Wealth may increase 20 Times as much, The Public Revenue being, almost by a Law of Nature, the $\frac{1}{10}$ Part of the People's Expence.

Wherefore suspending any further Answer to the said gross Objection, we proceed to say, That the Transplantation and new Cattle-Trade above-propounded, will produce the Effects hereafter mentioned. (vizt.)

Political Pastimes and Paradoxes: In an Essay
concerning a Perpetual Peace and Settlement of Ireland. With the Natural Union
of both Kingdoms and Peoples.

C H A P. I.

By this Title we mean the several Points following. (vist)

1. **T**Hat whereas there are in Ireland about 8 Roman Catholicks for one of all other Perswasions¹, So to order the People of both Nations and Religions, that there may be in England about 8 Non-Catholicks to one Roman Catholick, and 36 Times more Catholicks than at present: Whereas there are now about 280 others for one of them².

2. To enable the People of England and Ireland, to spend, in the several Comforts and Conveniencies of Life, 5 Millions-worth of Commodities per Ann. more than at present: The Value whereof is, at 20 Year's Purchase, One Hundred Millions, As also to raise the present Value of Ireland from 2 to 3.

3. To increase the King's present Revenue of both those Kingdoms, to about $\frac{1}{2}$ more than at present, without Increasing any Burthen upon the Subjects: So as the said Revenue may be sufficient for all Ordinary and Extraordinary Occasions, both in Peace and Warr. ✓

¹ See note on p. 142.

² Cf. note on p. 461, where Petty calculated but 186 $\frac{1}{2}$ non-Catholics to one Catholic in England.

4. To increase the Church-Revenues and Emoluments about $\frac{1}{4}$ more than at present: and so as, besides the present Maintenance of the Legal Clergy, to afford competent Gratifications (if the King please) for such Churchmen and Divines of other Perswasions, as do promote the Peace and Piety of the People.

5. To cut up the Roots of those Evils in Ireland, which by Differences of Births, Extractions, Manners, Languages, Customs, and Religions, have continually wasted the Blood and Treasure of both Nations for above 500 Years; and have made Ireland, for the most Part, a Diminution and a Burthen, not an Advantage, to England.

6. To settle the Names, Bounds, Titles, and Value, of the Lands in Ireland; so as to coin the same into a currant Coin, better than that of Gold and Silver, for any Trade Domestic or Foreign.

C H A P. II.

The State of the Case represented in Terms of Number, Weight, and Measure; and thereby made capable of Demonstrations. (vizt)

1. **W**E suppose England and Wales to consist of about 36 Millions of Statute Acres and Ireland of about half the same Number.

2. That in England, Wales, Jersey, Guernsey, and the Isle of Man, are 25 Thousand Roman Catholicks, Men, Women, and Children: and 7 Millions and 75 Thousand of all other Perswasions.

3. That in Ireland are 1300 Thousand People; whereof 8 of 9 are Roman Catholicks. (vizt) 145 Thousand Non-Catholicks of all Sorts, and 1155 Thousand Catholicks¹.

4. That the Rents of the Lands of Ireland, are about 1200 Thousand Pounds per Ann. and those of England about 11 Millions.

¹ A variation from the estimate of 1672, *Polit. Anat.*, p. 142, note.

5. The Rents in England are worth 20 Year's Purchase, and those of Ireland (Ano. 1687) about 10 Years.

6. That the Territory of Ireland will Breed and Feed 6 Millions of Beeves of 3-years-old apiece; or the Equivalent in other Species of Cattle.

7. That 300 Thousand Herdsmen and Dairy-Women are sufficient to manage the Trade of the said Cattle.

8. That amongst Beeves, or great Cattle, $\frac{1}{4}$ Part are, or may be, Milch-Cows; and that $\frac{1}{4}$ part of the whole may be slaughter'd every Year, without Prejudice to the main Stock.

9. That as many Cattle as Ireland will breed, are worth about 6 Millions of Pounds.

10. That 4000 Men at Sea, 2000 Horse, and 15000 Foot at Land, being the $\frac{1}{10}$ of the 150 Thousand Heardsmen, supposed to be left in Ireland, is a sufficient Guard for that Kingdom, and more proper than what has ever yet bin instituted, and a good Beginning of a real *Mare Clausum*.

11. That the Expence of the People in Ireland, at a Medium, is 5*l.* per Head, and in England 6*l.* 13*s.* 4*d.* per Ann.

12. That the Value of all Houses in Ireland, and Goods not fit to be brought into England, or to be used in the Cattle-Trade, is about 2 Millions.

13. That the Maintenance of as many Divines, as are fit for 300 Thousand Heardsmen &c. above mention'd, need not be above 20 Thousand Pounds per Ann. So as a 100 Thousand Pounds per Ann. of the Church Revenues in Ireland, may be brought into England, for Church-Uses.

14. That England never got out of Ireland 200 Thousand Pounds per Ann. nor (till of late) any Revenue at all to the King.

15. That now Ireland will send into England directly, or into Foreign Parts (which at last will terminate in England) at least 1500 Thousand Pounds per Ann.

16. That 20 Shillings may serve, with good Method and Order, to bear Travelling Charges of Men, Women and Children, one with another, from the Middle of Ireland to the Middle of England; being about 120 Miles by Land.

17. That when the Trade of 6 Millions-worth of Cattle is made so Simple, Easy, and Constant, in the Breeding, Feeding, and Vending the same; the Value of the said Stock of Cattle must needs be rais'd thereby to at least $\frac{1}{3}$ Part more, and become worth 7 Millions; especially if the Interest of Money shall fall from 3 to 2, or from 10 per Cent. to 6*l.* 13*s.* 4*d.*

18. When there shall be but 300 Thousand Souls in Ireland, and those all Herdsmen and Dairy-Women (whereas there are now 1300 Thousand of higher Quality) the Charge of the Clergy there will not be so great by 100 Thousand Pounds per Ann. as now: It being now about 120 Thousand Pounds per Ann. in Church-Lands, and appropriate Tyths.

19. The Charge of the Civil Government in Ireland, under the Paucity and Simplicity of the People above-mentioned, being but¹ a Kind of Factory, needs be but $\frac{1}{3}$ of what it is at present, or about 5000 Thousand £ per Ann. For then the horrible Expence of Law-Suits will be almost abolish'd.

20. The King's Revenue of England is suppos'd to be 1800 Thousand Pounds per Ann. That of Ireland 270 Thousand neat: And that of Scotland 130 Thousand; In all 2 Millions 2 hundred Thousand Pounds.

C H A P. III.

The 6 first mention'd Points are proved out of the 20 Suppositions or Assertions next before-going. (vizi)

AS to the first Point or Advantage: Which is that, granting the Catholicks in Ireland are to all others as 8 to one, or rather as 1157 Thousand to 143 Thousand, the whole People being 1300 Thousand Souls: We say that when a Million are Transported out of Ireland into England, the Proportions now and then are, and will be, as in the Table following. vizt

¹ 'but' inserted by Petty.

	People	Protestants	Papists
In England, Jersey Guernsey & Isle of Man	7100 Thousand	whereof 7075 Thousand	25 Thousand
In Ireland are now	1300 Thousand	143 Thousand	1157 Thousand
	<u>8400</u> Thousand	<u>7218</u> Thousand	<u>1182</u> Thousand

	People	Protestants	Papists
Now adding one Million to the above 7100 Thousand In Ireland	8100 Thous.	7185 Thous.	0915 Thous.
	300 Thous.	33 Thous.	267 Thous.
Total	<u>8400</u> Thous.	<u>7218</u> Thous.	<u>1182</u> Thous.

So as the Non-Catholicks left in Ireland will be as now about $\frac{1}{3}$ of the whole, or $\frac{1}{3}$ of the Catholicks; And in England, after the Transportations of a Million, the Catholicks will be 915 Thousand, and the others 7185 Thousand; which differs little from the above-mention'd Proportions in Ireland. And having thus made this great Transplantation in Paper and Conceit, it remains to shew by what Means or Methods the same may be really executed.

I forbear to say that the Conquerors of ancient Times and even now in the Oriental Countreys, do execute their Conquest, by Carrying away Captives into their own Countreys, and not by Maintaining great Armies, in the Conquer'd Countreys, to keep the Conquer'd Party in Subjection, which Overplus of Number and Reputation will doe at home, especially, when the Conquerors have Land enough, to employ all the Hands both of their Conquering and Captive Subjects. Nor do we insist upon an Act of Parliament in Ireland, to force a Million of People to Remove out of their Native Countrey; or an Act of Parliament in England to force them hither: Which may be interpreted, in a Case between Catholicks and others, to be a Breach of the Liberty of Conscience lately granted by his Majestie¹. Wherefore, we shall rather shew, That it will be the Profit, Pleasure, and Security of both Nations and Religions to Agree herein. In Order whereunto we shall consider the Present Inhabitants of

¹ James II.'s Declaration of Indulgence had been issued 4 April, 1687.

Ireland, not as old Irish, or such as lived there about 516 Years ago, when the English first medled in that Matter; Nor as those that have been added since, and who went into Ireland between the first Invasion and the Change of Religion; Nor as the English who went thither between the said Change, and the Year 1641, or between 1641 and 1660; Much less, into Protestants and Papists, and such who speak English, and such who despise it.

But rather consider them

- 1° As such as live upon the King's Pay.
- 2° As owners of Lands and Freeholds.
- 3° As Tenants and Lessees to the Lands of others.
- 4° As Workmen and Labourers.

As to the first, the King may command them to Dwell and Reside where he pleases.

As for Land-Owners, the King is able, and it would be his Profit, to buy a great Part of them out, at the present-full-Market-Rate. But without Compulsion. If the propounded Transplantation will raise the Prices from the present 10 Years Purchase or less, to about 20 as in England; And if the possess'd Landlords, not selling their Lands in Ireland, should make more Benefit of the said Lands and Stocks, by putting them under the new Method of Plantation, whilst themselves do withal become Farmers in England, for the Equivalent to their own Estates in Ireland.

As for the Tenants, Farmers, and Lessees now in Ireland, they may well remove into England to be Farmers there, to¹ live in a more cultivated Countrey, and in more Elegant Company, and Variety of Entertainments; and where the Landlords of England shall see Cause to Lett them good Bargains and bid them Welcom.

And as for Labourers, it is manifest they live in Ireland cheaper than in England but by $\frac{1}{4}$ Part; whereas their ordinary Wages is near double in England. But how these Tempting Profits shall arise, is the next Point of this Discourse.

¹ 'to' inserted by Petty.

CHAP. IV.

How to enable the People of England and Ireland to spend 5 Millions worth of Commodities more than now: And how to raise the present Value of the Lands and Goods of Ireland from 2 to 3.

THIS is to be done. 1. By bringing one Million of the present 1300 Thousand of the People out of Ireland into England, tho' at the Expence of a Million of Money. 2. That the remaining 300 Thousand left behind be all Herdsmen and Dairy-Women, Servants to the Owners of the Lands and Stock Transplanted into England; all aged between 16 and 60 Years, and to quit all other Trades, but that of Cattle, and to import nothing but Salt and Tobacco. Neglecting all Housing, but what is fittest for these 300 Thousand People, and this Trade, tho' to the Loss of 2 Millions-worth of Houses. Now if a Million of People be worth 70*l.* per Head one with another, the whole are worth 70 Millions; then the s^d People, reckon'd as Money at 5 per Cent. Interest, will yield 3 Millions and a half per Ann. (3.) And¹ if Ireland send into England 1 Million and a half worth of Effects (receiving nothing back) Then England will be enriched from Ireland, and otherwise, 5 Millions per Ann. more than now: Which, at 20 Year's Purchase, is worth one Hundred Millions of Pounds Sterling, as was propounded. Now to prove the People thus Transplanted worth 70*l.* per Head: I say first, That the present Rents of all the Lands of Ireland doth not exceed 1200 Thousand Pounds per Ann. Nor does it appear, by the Civil Survey of Ireland, to have been even² so much before the Commotions Anno 1641. Moreover the Value of all the Stock of Ireland exceeds not 6 Millions; the Interest whereof, at 10 per Cent. is 600

¹ 'And' inserted by Petty.

² 'even' inserted by Petty. In the *Polit. Anat.*, p. 152 he estimates the fee simple of Irish lands in 1641 at "above 8 millions."

Thousand Pounds, and the Rent of the Housing to be neglected, not above 200 Thousand Pounds per Ann. in all 2 Millions. The Expence of 1300 Thousand People (at 5*l.* per Head per Ann. one with another) is 6½ Millions: Out of which deducting the said 2 Millions for the Lands, Housing and Stock, the Remainder is 4½ Millions: Which, at 20 Year's Purchase is worth 90 Millions: And if 1300 Thousand People be worth 90 Millions, each Head must be worth very near 70 Pounds¹.

An ordinary Artisan earns 20*d.* per Diem, or 26*l.* per Ann. and may live very well upon 12*l.* and save 14*l.* per Ann. Which, at 10 Year's Purchase for a Life, makes 140*l.* the Double of 70*l.*, the Medium between ² & 140.

If the Rents of the Lands of England and Wales be 11 Millions, when the People are but 7 Millions, then the Addition of another Million will make the Rents ¼ Part more than now, and the Number of Year's Purchase will be ¼ more also: So as the Land will rise from 7 Times 7 (which is 49) to 8 Times 8 (which is 64) or from about 3 to 4, by Adding a Million of Hands: And consequently if the Lands of England be worth 11 Millions per Ann. they are, at 20 Year's Purchase, worth 220 Millions now: And being improved in the Proportion of 49 to 64, or from 3 to 4, they will be worth 73 Millions more than now, answerable to the value of Additional Hands afore-mentioned.

4. Nor is it difficult to believe, That People, who may live in England upon 6*l.* 13*s.* 4*d.* per Ann. may earn so much, and 3*l.* 10*s.* 0*d.* more per Ann. At which Rate a Million of People make 3½ Millions of Superlucration per Ann.

As to the next Point, that Ireland may send into England 1½ Millions worth of Commodities, receiving nothing back: I say that if Ireland be Stock'd with 6 Millions of Great Cattle or Beeves, That ¼ of them or 1500 Thousand, being Milch-Cows, will yield Butter and Cheese worth 24 shill. per Ann. apiece In all 1800 Thousand Pounds. And that ¼ of them be Yearly

¹ Cf. note 2, p. 454.

² A blank in the MS., opposite which the copyist set a 'q' in the margin. Zero might have been inserted.

Slaughter'd at 30s. per Head will make 1800 Thousand Pounds more. In all 3600 Thousand Pounds: Of which Summ 2000 Thousand Pounds must be spent in Ireland, to maintain 300 Thousand Heardsmen and Dairy-Women¹, and 100 Thousand Pounds to maintain the Forces, Clergy and Civil Government. The rest (being 1500 Thousand Pounds) may be sent either directly into England; or into Foreign Parts, at length to be also return'd thither.

The last Point of this Chapter is to shew, how the present Value of Ireland shall, by this new Oeconomy, rise in Value from 2 to 3. To which I say, That if the Rents be under 1200 Thousand Pounds per Ann. and Lands, in the Year 1687, not worth 10 Year's Purchase,

then the Value of Lands is scarce	12 Millions.
The Value of Stock as aforesaid	6 Millions.
And of the Housing, which have two or more } Chimneys; the rest being reckon'd for nothing }	2 Millions.
In all	20 Millions.

And we say that upon that Settlement and Union of People by this new-inexpensive Government and Simplicity of Trade, the Lands of Ireland will be worth 20 Year's purchase, as well as in England and Scotland: And consequently 24 Millions, and the Stock liable before to Distress and other Disturbances, Law-Suits, and Thefts, will rise at least from 6 to 7

7
24
In all to 31 Millions.

And out of 31 Millions deducting one Million for the Charge of Transplanting a Million of Heads; the Remainder will be 30 Millions, which now is but 20.

¹ Petty thus allows the herdspeople £6. 13s. 4d. expence, the English rate, cf. p. 559.

CHAP. V.

That the King's Revenue in England and in Ireland, supposed to be 2070 Thousand Pounds, will be increased to above $\frac{1}{2}$ Part more (vizt) to¹ above 414 Thousand Pounds; and even to 450 Thousand Pounds: So as to be in all 2520 Thousand Pounds.

FOR if in England the Duties of Excise, Customs, and Hearths be above 1400 Pounds; then by the Addition of one Million of People to the 7 which are already, the said 1400 Thousand Pounds, must be above 1600 Thousand Pounds, or 200 Thousand Pounds more than at present.

Moreover if the Produce of 1500 Thousand Milch-Cows, at 24 Shillings each, be 1800 Thousand Pounds, and of the 1200 Thousand Slaughter'd Beeves, be 1800 Thousand Pounds more, in all 3600 Thousand Pounds, Out of which 2 Millions of Pounds are to be pay'd as Wages to the 300 Thousand Servants, and 80 Thousand Pounds to the Land-Forces and Civil Government of Ireland, and 20 Thousand Pounds to the Clergy; in all 2100 Thousand Pounds; then the Remainder sent into England will be 1500 Thousand Pounds: Which added to the $3\frac{1}{2}$ Millions arising from the Improvement of the Land in England (as aforesaid) will make the whole to be 5 Millions; the $\frac{1}{20}$ Part thereof is 250 Thousand Pounds: Which, with the 200 Thousand Pounds Increase from the Customs, Excise, and Hearths, makes up the 450 Thousand Pounds above-mentioned. I here add that if, by the like Transplantation out of the High-Lands in Scotland, into the Low-Lands of the same, or into England, the 130 Thousand present Revenue of Scotland should increase $\frac{1}{2}$ Part, and become 156 Thousand Pounds²: So the Revenue of the 3 Kingdoms would be 2676 Thousand Pounds.

¹ ? a slip for 'by.'

² On p. 579 Petty revises this calculation.

Now if the Charge of England could be defray'd for 1300 Thousand Pounds per Ann. in Times of Peace, and that of Ireland with 200 Thousand Pounds, and that of Scotland with 68 Thousand Pounds (the $\frac{1}{3}$ of Ireland) in all with 1568 Thousand Pounds per Ann. the Overplus would be 1108 Thousand Pounds. Now for as much as in England there has not been found, for these many years, more than one Year of Warr to 3 of Peace, the said Overplus of 1108 Thousand Pounds for three Years of Peace would be 3324 Thousand Pounds: Which added to the Yearly Revenue of 2676 Thousand Pounds will make a Stock of 6 Millions for the Year of Warr: Which is thrice as much as has been spent in any late Year of Warr, and consequently sufficient for all Uses in View. We further say that because the King's Revenue in Ireland is at present 270 Thousand Pounds neat; and because but 80 Thousand Pounds thereof is by this New Model to be spent in Ireland; It follows that 190 Thousand Pounds more must be paid him in England out of the 1500 Thousand Pounds above-mentioned to be sent thither.

And moreover because the Church-Benefices of Ireland are 120 Thousand Pounds per Ann. whereof onely 20 Thousand Pounds, by this new Model, is to be spent by the Clergy in Ireland; It follows that the remaining 100 Thousand Pounds be transferred to Church Uses in England: And consequently when 290 Thousand Pounds of 1500 Thousand Pounds shall be paid to the King and Church, there will remain 1210 Thousand Pounds payable to the Owners of Irish Lands and Stock, who live in England.

CHAP. VI.

IF the Charge of the Clergy in Ireland be now 120 Thousand Pounds per Ann. and after the Transplantation no more than 20 Thousand Pounds, then there will be 100 Thousand Pounds per Ann. overplus; which will afford 100*l.* per Ann. to 1000 Divines dissenting from the Authoriz'd Religion,

whose Business may be, to keep Peace among their Flocks, and dispose them to Obedience towards their Sovereign.

Lastly, if the Lands of all England increase from 49 to 64, or from 3 to 4, those of the Church will do the same also.

CHAP. VII.

How to take away all the Evils arising from Differences of Births, Extractions, Languages, Manners, Customs, Religion, and Laws, and Pretence whatsoever.

1. **T**HERE is no Person or Party in Ireland, of what religion soever, who denies the King of England to be King of Ireland also.

2. Whereas there are Disputes concerning the Superiority of Parliament; now there will need no Parliament in Ireland to make Laws among the Cow-Herds and Dairy-Women: Nor indeed will there be any Peers, or Free-holders, at all in Ireland, whereof to make a Parliament.

3. There will be little Pomp or Expence in the Chief Governor &c. the onely Business being to regulate the simple Cattle Trade to the best common Advantage.

4. The Courts of Judicature may be much abated, for that there will be little or no Variety of Cases or Actions.

5. The Officers of Ports will need onely to keep an Account of Exportation, where there are no Importations, or very little or simple.

6. The Work of the Clergy will require little intricate Learning or School-Divinity.

7. The 267 Thousand Catholicks may be such as can all speak English, and who will take English Names.

8. The Lands upon the down-Survey, may also have English Names put upon them.

9. The Transplanters into England may do the same.

10. The 300 Thousand left in Ireland are all Servants to those who live in England, having no Property of their own, in Land or Stock.

11. Money need be but little and that Local.
12. Cloths may be uniform, and withal equal, and also most commodious for the People's Employments.
13. The Catholic Priests may be English-men.
14. The 15000 militia¹ Men being $\frac{1}{10}$ of the whole Number of Men, may serve by Turns as Soldiers every tenth Year.
15. The 4000 Men at Sea in 40 small Ships are enough to begirt Ireland, or to keep a Guard between the North of Ireland and Scotland: as also between Scilly and Kingsale, as the beginning of a real Mare Clausum².
16. The Lands may be valu'd according to the annual Increase of Flesh produceable from the same, restraining and reducing all other Respects to that one.
17. Controversies concerning Estates in Ireland, may be determined in England, where the Pretenders are now to Live.
18. Whereas it may be offensive to make Estimates of the Number of Men slain in Ireland³ for the last 516 Years; and of the Value of the Money and Provisions, sent out of England thither; Of the Charge of the last Warr begun Anno 1641; The Value of the Wasting and Dispeopling the Countrey, Charges at Law for the last 30 Years &c. We say that the same may be all spared, Since all may be probably remedied and forgotten by the Means and Methods above-mentioned.

¹ 'militia' inserted by Petty.

² See note on p. 573.

³ The *Polit. Anat.*, which contains such estimates, (pp. 150, 151) was not published when Petty wrote. On p. 608 he handles the subject somewhat gingerly.

CHAP. VIII.

How the Names, Bounds, Titles, and Values, of Lands may be settled and ascertained; with Remedy of the Miscarriages, which have happened in the 35 Years last past in the Disposures of them.

1. **L**et the down-Survey be finished according to the Clause in the 73d. Page of the Explanatory Act, and a certain Number of Denominations be pitched upon to be onely used in Public Instruments and Conveyances; and let the Spellings of each be also ascertained and published, and withal to every Surround upon the Plotts and down-Survey be added an English Name.

2. Let all controverted Bounds, be perambulated by the Persons concern'd, and the Determination of them be described by the Chain and Needle.

3. Let all remaining Wrangles about the title be determined in England by indifferent Persons, without respect to Nation and Religion, and then well and clearly registred.

4. Let the Value of each Denomination be expressed by the Increase of Flesh producible from the same at a Medium of 7 Years, reducing all other Qualities into that onely.

5. Let the Number of Years Purchase be determined by the common Voice of both Nations, to be renewed every 7 Years.

6. And let there be a Registry of all these Matters and of all Alienations from Hand to Hand.

Memorandum. That it may, as an Objection, be asked, Why a Million of People might not rather be sent out of England into Ireland, to raise the Number in Ireland from 4 to 7, and reduce that of England from 7 to 6. I answer, No.

For the Value of Lands in England being 220 Millions, the Taking away one Million of it's 7 Millions of Inhabitants would lessen it's Value from 49 to 36, or from 4 to 3 to the Loss of 55 Millions. And the Value of the Lands of Ireland

being but 12 Millions, the Increase of its Inhabitants would but raise it's Value from 16 to 49 or from 1 to 3, and make it rise from 12 to 36 Millions, to the Gain of 24 Millions for Ireland, & y^e Loss of 55 from England.

Whereas the Transplantation of a Million into England gains 100 Millions in Common to England and Ireland, and 10 Millions in special to Ireland, besides many other Benefits to both Nations, which do not fall under the Computation of Numbers. From hence may be drawn a General Rule to compute the Profits or Loss of Sending People, out of England or Ireland, to the American Colonies, and indeed from any City or Countrey to another, whose Value and People are known.

CHAP. IX.

A Repetition and Enlargement of what has been here said.

1. **T**HAT the Present Number of Roman Catholicks in England may be increased from 25 Thousand to 915 Thousand, or from one to above 36, without forcing any Man's Conscience.
2. That the People of England and Ireland may gain $3\frac{1}{2}$ Millions per Ann. out of the Earth and Sea, and from Foreign Nations; and that England may get from Ireland $1\frac{1}{2}$ Million more: In all 5 Millions per Ann. by this Atchievement.
3. That the King's Revenue in England and Ireland may be advanced from 2070 Thousand Pounds to 2520 Thousand Pounds: And by Addition of 156 Thousand Pounds per Ann. from Scotland to 2676 Thousand Pounds in all.
4. That the Charge of the Whole Government in Time of Peace may be possibly defrayed for 1568 Thousand Pounds, Leaving an Overplus of 1108 Thousand Pounds per Ann.
5. That there being 3 Years of Peace in these Nations

for one of Warr, the said 3 Years Overplus will be 3324 Thousand Pounds; which, added to 2676 Thousand Pounds, will make a Bank of 6 Millions Pounds for the one Year of War.

6. That the said 2676 Thousand Pounds per Ann. will not be the $\frac{1}{10}$ Part of the Expence of the Nation; and therefore so far from being intolerable, that it will scarce be a sensible Burthen.

7. That what was said of Bringing a Million of People into England out of Ireland, and Leaving 300 Thousand Heardsmen &c. behind; may be apply'd to Scotland, by bringing 300 Thousand People out of the High-Lands into the Low-Lands or England, and leaving 100 Thousand Herdsmen behind in the High-Lands, or Northermost Third Part of that Country.

8. Upon this Transplantation, join'd with the former, the People inhabiting in England and Wales, and the Low-Lands of Scotland, will be 9300 Thousand; And their Expence, at 6*l.* 13*s.* 4*d.* per Head will be 62 Millions per Ann. the $\frac{1}{10}$ Part whereof is above 3 Millions per Ann. and much above the 2676 Thousand Pounds above-mentioned for the Public Revenue.

9. When the whole People shall be 9300 Thousand, as above-said, the English, Scotch, and Irish, Catholicks, living among them, will be near 920 Thousand, or near $\frac{1}{10}$ of the whole, whilst in the High-Lands of Scotland there may be no Catholicks at all, keeping 267 Thousand in Ireland.

10. The above-mentioned Provision of 6 Millions for a Year of Warr will maintain triple the greatest Land-Army and Sea-Fleet, that have (at any Time) been seen in or about England, with all the Civil Charges beside.

11. There will be, in this new Kingdom of 9300 Thousand Inhabitants about 2300 Thousand Males naturally able to bear Arms, of which the $\frac{1}{10}$ Part, or 230 Thousand may be spared and supported for the Purpose, being enough for the greatest Extremity in view.

12. The Church-Lands and Tyths in England will by this Transplantation improve, as all other Lands, from 49 to

64, or from 3 to 4: Besides the Addition of 100 Thousand Pounds per Ann. to be transferred from the Church of Ireland to that of England for extraordinary Uses.

13. Of the 200 Thousand Pounds per Ann. allotted for the Guard of Ireland 120 Thousand Pounds is intended for 4000 Seamen in 40 small Ships sufficient to begirt Ireland; and to guard 2 Lines: The one between the North of Ireland and Scotland, the other between Kingsale and Silly, Which, with two Lines more, the one from Ushent in France to Silly, and the other from the North of Scotland to Norway, will make a real *Mare Clausum* never yet described.

14. It follows from the Premises, That it is not the Interest of England to seek more Territory, nor to send Auxiliary Men to their Allies, worth (being all able bodied Men) about 100*l.* per Head: Few such having been observ'd to come back when once sent out.

15. Consequently England may still think of being Sovereign within a *Mare Clausum*, the Profit and Loss whereof is handled elsewhere¹.

16. The Lands of Ireland, by ascertaining their Names, Bounds, Titles, and Values, and by the Simplicity of Trade here propounded, will be made a better Material for Money than Gold and Silver, as far less subject to Abuses; as also Usury will be thereby lessened.

17. The Manners, Habits, Language, and Customs of the Irish (without Prejudice to Religion) will be transmuted into English, within less than an Age, and all Old Animosities forgotten.

18. The insnaring Questions, between England and Ireland, about the Supremacy of Parliament; the Multitude of Law-Suits; the Vexations about Levying the King's Revenue; the Irregularities of Coins, and the Want of the same for Trade, will all, or the most part, cease and be abolished.

19. Where 5 Millions of Profit rises (as is here propounded) from the Earth and Sea, the consequent or concomitant Profit arising from the Labors of the People

¹ Petty's discussion of this subject appears to be lost.

is (Generally speaking) Triple to the same, and should in this case be 15 Millions more.

But where Land is cheap, the Rent is scarce $\frac{1}{3}$ and the Labor is above $\frac{2}{3}$. Wherefore we say in Ireland the Expence of the People is 6500 Thousand Pounds, the Rent of Land almost $\frac{1}{3}$ of the same, or 1200 Thousand Pounds: The Labor of the People to the said Rent as 7 to 2, or 4200 Thousand Pounds. And the rest, being 1100 Thousand Pounds, for the Interest of the Stock of all sorts.

And in England the Expence of the People is 47 Millions, the Rent of the Land 11 Millions; the Labor of the People to the said Lands as 5 to 2, or $27\frac{1}{2}$ Millions of the whole: And the remaining $8\frac{1}{2}$ Millions, is for the Interest of the Stock or Personal Estates. So as when England shall gain $\frac{1}{4}$ Part of 11 Millions by the Rent of Land, it shall gain $\frac{1}{4}$ of the same Summ by the Labor of the People, vizt. about 3 Millions and 920 Thousand Pounds per Annum.¹

AN APPENDIX OF OBJECTIONS TO THIS ESSAY,
WITH ANSWERS TO THE SAME.

First that the Transplantation of a Million of People is Impracticable and Utopian.

Answer.

1st. It has been already said that the Charges thereof needs not to exceed 20 Shillings per head at a Medium between Poor and Rich, Great and Small; and from the Middle of Ireland to the Middle of England supposed to be 120 Miles of Land in^a Distance.

2. Forty small Vessels of about Sixty Tuns each (which are easily had) will perform this whole Work in Five Year's Time.

¹ Here follows, in Addl. MS. 21128, *Another View of the same Matters*, which is printed after "the eighth objection," p. 606. Cf. p. 548.

² MS. 'and,' altered by Petty.

3. The Freight per head need not exceed Two Shillings, and the Travelling Charges by Land at one Penny per Mile needs not be above Ten Shillings, Leaving Eight Shillings for Extraordinaries.

4. There will be found Undertakers enough, to regulate this Matter, and bring the Charges thereof to a Certainty, which may amount to 200 Thousand Pounds per Ann. to be advanced for Five Years out of the Public Revenue, and reimbursed, as shall elsewhere be shewn.

The second Objection, That the Cattle-Trade above-
propounded is also impracticable.

Answer.

1. The Lands and Cattle are the same as now, wanting onely a new Application to each other.

2. A Council of Fitting Persons must make this Application, by Pitching the Number of each Species of Cattle, for every Sort of Land within the whole¹ Territory of Ireland.

3. The same may pitch the Number of Cow-Herds, Shepherds, Dairy-Women, Slaughter Men and others, which are fit and sufficient to manage the Trade of exported Cattle dead or alive, of Hydes, Tallow, Butter and Cheese, Wool and Sea-Fish &c.

4. To appoint the Foreign Markets and Ports where each Commodity is to be shipped and sold, to provide Shipping and to keep Account of the Exportation above-mentioned, and of the imported Salt, Tobacco, with a few other Necessaries.

5. When the whole Number, to be left in Ireland, is adjusted, then to pitch how many of them shall be English, or such as can speak English, and how many Irish, how many Catholiques² and how many others, without any other respect, than the Management of this Trade, for the common Good of all the Owners of these Lands, and it's Stock indifferently.

6. Forasmuch as it is intended to allow each Servant to this Trade 20 Nobles per Ann. out of the Grand Commodities

¹ 'whole' inserted by Petty.

² 'how many Catholiques' inserted by Petty.

aforenamed, It is also intended to allow them Land for Corn and Gardenage with River-Fishing, Wild-Fowl and Hunting.

7. To keep up Part of the neglected Houses, till England be fully Peopled with 12 Millions (vizt) at 3 Acres per head.

8. To appoint the Foot-Militia and Horse-Guards.

9. To carry away the Young Children and superannuated Persons.

The 3d Objection, That Men will not conform to this Change, tho' tending to the General, and their own Particular, Good, out of a mere Caprice and Perverseness.

Answer.

[1.] If the Owners of Ireland may hereby raise their Concernments from 2 to 3 in Value, If the Landlords of England may hereby increase the Worth of their Lands from 3 to 4, And if the King may advance his Revenue from 4 to 5; and that the Church may receive a Supplyment out of Ireland of 100 Thousand Pounds per Ann. I suppose that particular Men will not long persist in their Perverseness and Humor; Or (if they do) that a Parliament of England, may cure this Evil, in both Kingdoms, as kind Parents may correct the Children whom they Love.

2. And when such a Law is made, it is possible within Six Months to give a List of all the Terr-Tenants in Ireland, who are to be removed, and of the lands they hold; with the Yearly Value thereof. And within Six Months more, to make a Particular of the Lands in England, by the Names, Quantity, Situations, and Values, correspondent to the said Tenures and Occupancies in Ireland, if men shall humorously refuse to agree otherwise.

3. It hath been already said, that besides the Advantages abovementioned, the Inhabitants of England shall receive one Million and a half per Ann. out of Ireland, above what hitherto they have done: Which is more than England gains by Foreign Trade from all the rest of the World.

4. I further add that the Million of Transplantees out of Ireland, will after their having been Seven Years in England,

become worth above 30*l.* per head more than at present, in all 30 Millions.

Memorandum, That this Proposal inferrs no Forcing any Irish¹ Proprietors to sell their Estate in Ireland, but encourages the King to buy of them, who are voluntarily pleased to sell at the present Market-Rate.

It is also to be noted, That as the Method here propounded shall make the Value of Ireland to rise from 2 to 3 above what the same was worth Anno 1684. So the late Changes, which we hope are repairable², have made the same fall from 3 to 2, and consequently the Difference between the present Proposal and the present Practice, will be as 9 to 4.

The fourth Objection, that this Transplantation and Change of Trade amounts to an Abolishment of the Irish Nation: Which will be Odious to them, and not compensable by all the Benefits abovementioned.

Answer

1. That this Proposal was intended for an Union of the two Nations, which is a real Blessing to both, according to that of *Faciam eos in Gentem Unam*³: Whereas the Curse of a Civil Warr is, to divide one intire Nation into two Nations: As the Irish Commotions Anno 1641 actually did. Now if the two Nations be brought into one, the Name of the lesser Nation must needs be abolished, whilst the Thing and Substance is exalted. For

1. In this Case the Irish Names of Lands and Men are lay'd down, and English taken up in their Rooms.

2. The Cabineers of Ireland, which are Ten to One of all the others, will be removed out of their wretched Beastlike habitations; unfit for making Merchantable

¹ 'Irish' inserted by Petty.

² Clarendon had been appointed Lord Lieutenant of Ireland, in September, 1685. Tyrconnel became Commander-in-Chief and virtual viceroy in June 1686, and returned to the Island as Lord Deputy to succeed Clarendon in February 1687. His extreme catholic policy in both positions alarmed the Protestants in Ireland and large numbers of them returned to England with Clarendon. Clarendon, *Correspondence*, II. 138, *et passim*, Fitzmaurice, 271—273.

³ Ezekiel, xxxvii. 22.

Butter and Cheese, and the Manufacture of Wool and Linnen out of the best Materials.

3. They will be set upon more pleasant and profitable Employments in England.

4. They will be entertained there with greater Variety of agreeable Objects and Exercises.

5. They will be nearer the King, who hath a Kindness for them, with full Liberty of Conscience.

6. They will be safe from any Re-Conquest, which may be fatal to them.

7. They will be ingrafted and incorporated into a Nation more Rich, Populous, Splendid, and Renowned than themselves, for Letters, Arms, and other Atchievements.

8. This Transplantation will make the People of Ireland to be a real Addition (whereas they had been hitherto a Diminution and Counterpoize) to the Power of England, and for above 500 Years a vast Expence of it's Blood and Treasure.

The 5th Objection, That Changing the present Proportions between Catholicks and others in England (now 280 for one) to that of Nine for One, will be very formidable to the Protestants of England, and apt to create dangerous Fears and Jealousies in them.

Answer

1. Altho' I never intended to complicate Religion with the Matters of this Essay, yet I may intimate that, by the late Changes in Ireland, of the Government, Army, Judicatures, Sherriffs, Jurys, and by bringing together and concentrating all the Catholick Powers; and by Publishing a Design of making the Catholicks there as considerable in their Wealths, as in their Numbers¹; which has caused the Price of Lands and houses and Cattle so to fall, and the English Artizans and Money so to diminish, As that the whole of Ireland, in

¹ Confirms Bonrepaus's letter of 4 Sept., 1687, to Seignelay, concerning the trustworthiness of which Lingard professed some doubt. *Hist. of England*, 5th ed., x. 243, 414; cf. Mazure, *Hist. de la Révolution de 1688*, II. 287.

this Year 1687, is fallen from 3 to 2 of what the same was worth Anno 1683, and will probably cause a Fall in his Majesty's Revenue from about 7 to 6. I say, I might intimate from the Premises that some Remedy is necessary.

2. Moreover the imagined Benefit of making Ireland an Asylum¹, by the present Method, for all the King's Catholic Subjects, in case of an angry-Heterodox Successor to the Crown, is not comparable to the Danger of Ireland's Revolt and Reconquest.

Lastly, Whether the present united State of Catholicks in Ireland will make more Catholicks in his Majesty's whole Dominions, than the Transplantation here propounded, I know not, seeing no manifest cogent Reasons for either Opinion. Onely it is certain it will make Six and Thirty Times more Catholicks in England, than now there are, but not one more in the whole.

Wherefore if what concerns Religion be doubtful, let the same be left to God, whose peculiar Work it is; and let what is Obvious and Certain concerning the Wealth, Strength, Splendor, and Honor, of both Nations be consider'd according to Sense and Reason, to which God has left these Matters.

Memorandum, That what was said in the above-Essay concerning Transplantation in Scotland², ought to have been thus (vizt.).

Suppose Scotland to contain as many Acres and People as Ireland; we may suppose that in the Northermost Third Part or Six Millions of Scotland there dwells 400 Thousand of the whole 1300 Thousand People. Of which 400 Thousand we suppose 300 Thousand to be transplanted into the Low-Lands, or rather into England; leaving 100 Thousand behind for the Cattle-Trade. So as there will be 7 Thousand 100 Thousands, and a Thousand Thousand, and 300 Thousand in England and Wales, and 900 Thousand in the Low-Lands of Scotland; Making in all 9 Millions and 300 Thousand heads to Live upon the whole 48 Millions of Acres, which may be called Great England; Leaving 100 Thousand, as aforesaid, upon the Northermost Third, which may be called Little

¹ Cf. note on p. 578.

² See p. 556.

Scotland besides 300000 upon the 18 Millions of Ireland, as aforesaid. The Consideration of all which may be placed to the Accounts of Political Pastimes and Recreations, according to the first Title of this Essay.

The Sixth Objection. In the Title of this Essay, Mention was made of Settlement in Ireland, I suppose that Settlement of Estates and Title of Land was thereby intended, which (I am affraid) is not yet perfect. Forasmuch as there is great Complaint made against the gross Partialities in the Act of 17^o Car. I^{mi}. In the Acts of Settlement A^o 1652. In the Acts of Satisfaction made A^o 1653. In two other Acts made A^o 1656. In the Proceedings in the Court of Athlone and Loghreagh¹. In several Courts for Protestant's Claims before the King's Restauration. In the Acts of Settlement made since Anno 1662, and executed Anno 1663. In the Courts of Innocence. In the Acts of Explanation made A^o 1665, and executed in the Years 1666, 1667, and 1668. In the Proceedings upon the Commission for Moderating of Quit-Rents A^o 1676. In Settling the Transplantees of Connaught and Clare A^o 1677. In the Court of Grace A^o 1684. And most of all, in the Proceedings of the Judges, Sherifs and Juries, A^o 1687. I say, no great Matter has been offered in this Essay for remedy of the Evils contained in the Acts and Proceedings last mentioned. Which Remedies, I suppose, were mean't by the Word Settlement.

Answer.

1. We have supposed, That when the Catholicks and Proprietors of Ireland, as also the high-Landers of Scotland, are Transplanted into England, Wales, and the Low-Lands

¹ The Court of Claims and Qualifications of the Irish, called from the place of its sessions, the Athlone Commissioners, was appointed 28 December, 1654, to determine the guilt of each Irish proprietor and to ascertain the extent and value of lands which he had lately held on the English side of the Shannon. The Loughrea Commissioners thereupon set out lands, to such of the Irish as were transplanted into Connaught, according to the findings of the Athlone Commissioners.

of Scotland containing 48 Millions of Acres, and 9 Millions 300 Thousand People: Among which are all the Catholicks of the Three Kingdoms.

2. We further Suppose, That whereas there are now about 12 Thousand Parishes in the said 48 Millions of Acres, That by Dividing as many of the greater Parishes as are necessary, there may be made just 15 Thousand Parishes or Parochial Divisions; and that the Males of 21 Year's old within every such Division, do choose an Elector for the Great Council hereafter mentioned. And that the said 15 Thousand Electors, by 500 Assemblies of 30 Electors in each, do choose 500 Members for the General and Ultimate Judicature concerning Estates in Ireland.

3. And Lastly We suppose, That out of the said 500 Members, Juries may be chosen by Lott for the Consummation of this Work by Lott; that is to say, by God, it being hard to conceive any Authority more equal, impartial, and indifferent, than the said Juries, so chosen by God, by the King, and the whole People of all the Three Nations.

There be several other Instruments and Expedients to correct and perfect the present Settlement in Ireland; whereof I insert this one, to be wholly administred by the Catholic Party. (vizt)

There may be a Court erected by Act of Parliament, consisting of five of the most Ancient, Substantial, Upright and Experienc'd Catholic Gentlemen of Ireland, for the Ends following. (vizt.).

1. To find out what Lands any Catholic Restoree holds as his own, and rightfully derives from his Ancestors, as to their Propriety the 23d of October 1641, which in Truth was not so?

2. What Lands any of the Catholic Restorees have gotten by vicious and forg'd Deeds, altho' the Lands were their own or their Ancestors, in the Year 1641?

3. What Persons, adjudged Innocent by the Court of Claims A^o 1663, were more nocent, than those which the said Court did judge to be nocent?

4. What Persons, adjudged nocent, were more innocent, than those whom the said Court did judge to be innocent ?

5. What Persons restored by Proviso ex mero Motu¹, or as Nominees or Lettereers, did less deserve the same, than some of those who were never restored at all?

6. What Persons never restored, do deserve to have some Parts of their Estates, under two Thirds; and what Parts?

7. What meritorious Persons should be restored to their former Estates, in specie, or to the Equivalent, out of the Stock according to the Proportions that shall be respectively allow'd them?

8. That they consider what Catholicks have gotten Grants of other Catholic Estates?

9. That all Restorees, how innocent and worthy soever, may retrench Thirds as the Adventurers did.

10. That out of the Premisses there may be made a Common Stock for Remedys and Gratifications in the several Cases abovementioned, and for Reprizing of such Protestant Patentees as have been, or shall be, ejected.

11. That an accurate Valuation be made of all Lands in order to this Work.

12. That no Lands be disposed of out of this Stock, till the Court abovementioned have first stated what every Restoree or Removee is to have.

The Seventh Objection. What needs the Monstrous Plantation, the Innovation of Trade, and the General Judicature abovementioned, since Things are so well already in Ireland? And since almost all the Offices and Arms are already (and the Legislature itself may shortly be) in those onely who are of the King's Religion?

Answer

We have set forth the Benefits, which may arise from the Transplantation, Trade, and Judicature abovementioned : We come next, to set forth the Difference between Ireland, as it

¹ See *Polit. Anat.*, p. 131, note 2.

is in this present Year 1687, from what the same was in the Year 1683. In some of the principal Points undermentioned. (vizt)

1. The Rents of all the Lands in Ireland A° 1687¹, were worth 1200 Thousand Pounds per Annum, and 12 Year's Purchase, at a Medium between Lands near great Cities and Places of Trade, and the obscure thin-peopled Parts of the Nation: So as the whole Land of Ireland was then worth about 14 Millions 400 Thousand Pounds. But it is Generally believed that the Lands, which then might have been Lett for 3s. 6d. per Acre, and sold for 14 Year's Purchase (vizt for 49s. the Acre) will scarce in this Year 1687 yield 2s. 6d. per Acre, nor sell for above 10 Year's Purchase, vizt. 25s. the Acre or little above for half 49s. From whence we may think that the Lands, which A° 1683 were worth 14 Millions 400 Thousand Pounds, are now fallen 7 Millions thereof.

2. The Housing of Ireland having above one Chimney in each (for the rest we reckon not) have been estimated at 2 Millions; and it is too manifest that the Housing of Dublin are less worth now by one Tenth Part (some will say a Fifth) than they were A° 1683. Wherefore we estimate the whole Housing of Ireland to be fallen 200 Thousand Pounds.

3. All the Cattle of Ireland have been estimated at 5 Millions A° 1683, which in this Year 1687 will not yield above 3 Millions in the Market.

4. The Money, Plate, Jewels, and Fine Furniture, which has been these last Two Years conveyed out of Ireland, or otherwise withdrawn from currant Uses, seems by a numerous Collection of Observations and Relations to be about $\frac{1}{3}$ Part of the Whole, or about 160 Thousand Pounds.

5. The Value of Beer, Ale, Wine and other Drinks, which have been spent in the Years 1684, 1685, and 1686, above the Level of other Years, seems to be about 294 Thousand Pounds; and it is likely that the superfluous Expence in the same Year² of other Commodities may have been 100 Thousand Pounds more. In all 400 Thousand Pounds, Seven Eighths whereof was over-spent by the Irish.

¹ Apparently should be '1683'.

² ? years.

6. The Value of the Goods and Merchandize exported above the Value of the Goods imported in the same Time, appears to be 167 Thousand Pounds. Now the last Two of the Six last-mentioned Articles, may be deduced from the ensuing Table.

The Table A.

	1683 ¹	1684 ¹	1685	1686
Customes } Inwards	40870	43065	43167	49467
} Outwards	32092	33324	29453	40056
Imported Excise	44577	47606	47300	49334
Prisage.....	1452	1692	1882	1762
Excises on Beer and	68344	77583	79170	67572
Ale Licenses	8284	9338	9994	9457
The Total of the abovementioned and all the other Branches:	300083	318274	318073	334534

The Table B.

Anno 1685	Inward			Outward		
Lady Day Quarter	10263	07	—	7493	10	2 $\frac{3}{4}$
Midsummer Quarter	11436	17	10 $\frac{1}{2}$	5151	6	1 $\frac{1}{4}$
Michmas Quarter	11591	06	4 $\frac{1}{8}$	7829	1	5
Christmas Quarter	10201	08	4 $\frac{1}{8}$	8867	5	1 $\frac{1}{2}$
Anno 1686						
Lady Day Quarter	10288	14	2 $\frac{3}{4}$	8976	14	1 $\frac{1}{4}$
Midsummer Quarter	12890	—	0 $\frac{1}{4}$	6690	11	2 $\frac{1}{8}$
Michmas Quarter	14902	09	0 $\frac{1}{8}$	11 ² 76	10	3 $\frac{1}{8}$
Christmas Quarter	11874	10	8 $\frac{1}{2}$	12563	4	1 $\frac{1}{2}$
Anno 1687						
Lady-Day Quarter	11568	6	5	11824	5	6

¹ The figures for 1683 and 1684 differ somewhat from those given in Clarendon, *Correspondence*, I. 651—652.

² A blank space in the MS.

The Table C.

Lady-Day-Quarter.

	Ao. 1686			1687		
Prisage of Wines	676			482		
Excise of Beer and Ale	19028	10	7	17891	19	
Ale-Licenses	103	3	10	73	18	3
Wine Licences	211	6	5	194	5	
The whole Revenue	20019		10	18642	2	3
	31175			34180		

Customes.

	Inwards			Outwards		
First 3 Quarters	10263	7		7493	10	2 $\frac{1}{2}$
	11436	17	10	5151	6	1 $\frac{1}{2}$
	11456	1	— $\frac{1}{2}$	7829	1	5
	33291	10	11 $\frac{3}{4}$ ¹	20473	17	9 $\frac{1}{2}$
Last 3 Quarters	14902	9	— $\frac{1}{8}$	11762	10	3 $\frac{1}{2}$
	11874	10	8 $\frac{1}{4}$	12563	4	1 $\frac{1}{2}$
	11586	6	5	11824	5	6
	38363	6	9	36149	19	11
	33291	10	11	20473	17	9
	5071	9	10	15676	2	2
	4			12		
	20284			31352		
				15676		
				188112		
				20284		
				167828		

¹ No attempt has been made to correct the inaccurate footings of the MS.

CONCERNING SEVERAL DECAYS IN IRELAND.

Observations upon the Table A.

1. The Year 1683 was not remarkable for any extraordinary accident, and therefore we make it a fit Standard for the other Three Years; in the last whereof were extraordinary Changes upon King James the Second's coming to the Crown.

2. The gross Produce of the whole Revenue in the year 1683 was 300085*l.*: So as the next¹ disposable Revenue might be about 270000*l.*

3. In the Year 1685 (being the first Year of James the Second) the Prisage of Wines, which is the Measure of that Commodity, did rise from 1452*l.* to 1882*l.* (or from about 3 to 4) the Excise of Beer and Ale from 68344 to 79170 (or from about 6 to 7) and the Ale-Licenses from 8284 to 9994: All which are Signs of extraordinary Drinking in 1685.

4. The Difference between the Excise of Beer and Ale in the said years 1683 and 1685 was 10826*l.*, which even according to the small Gallon is about $\frac{1}{8}$ Part of the Value of the said Beer and Ale, Sold by Retail², shews that the extraordinary Expence of Beer and Ale in the said years was 86608*l.*

5. If we measure the Expence of Wine by the Prisage, then the Expence thereof A^o 1685 more than in 1683 was worth 26000*l.*, as the one Third of 80000*l.* which in round Number is the Yearly Expence of Wines of all Sorts in Ireland.

6. The Customs inwards A^o 1683 were 40870*l.* and A^o 1685 were 43167*l.* the Difference whereof is 2297*l.*: Which being multiplied by 4 (imported Goods being about Quadruple in Value to their Duties) gives 9188*l.* as the value of the extraordinary Quantity of foreign goods as they were worth before they were ship'd. Unto which must be added the Customs of them Inwards being 2297*l.* as aforesaid, with as much more for imported Excise, making in all 12782*l.* as

¹ Apparently should be 'nett'.

² ?Sc. 'which.'

the Value of the extraordinary Expence of Foreign Goods in that Year 1685.

7. So as the extraordinary Expence of Beer, Ale, Wine, and Foreign Commodities was 125,390*l.* in the Year 1685.

8. By the same Method of Computation the extraordinary Expence upon the 3 last aforementioned Heads A° 1686 was of Beer and Ale (nothing of Wine) about 20000*l.*, of Foreign Commodities 51582*l.*: In all 71582*l.*

9. The extraordinary Expence in the Year 1684 were also considerable (the Causes whereof I do not meddle with) vizt in Beer and Ale 73912*l.*: in Wine 10000*l.*: in Foreign Goods 13902*l.*: In all 97814*l.*

10. The said extraordinary Expence was in 1684, 97814*l.*; A° 1685, 126390*l.*; and A° 1686, 71582*l.*: And in all the said Three Years 294786*l.* Besides 106000*l.* guessed to be for Inland Superfluities.

Observations upon the Table B.

1. The said Table containeth 9 Quarters of a Year, whereof in the 3 first Quarters, or first Ternary, the Customs inwards were 33291*l.*, and outwards 20473*l.*; and in the last 3 of the said 9 Quarters or 3^d Ternary, the Customes inwards were 38363*l.* and outwards 36149. The Difference in the outward Ternaries is 15676*l.*, which multiplied by 12 (the Value of Exported Goods being 12 Times as much as their Duties) gives 188,112*l.*, as the probable Value of the extraordinary exported Goods in the said 3 last Quarters. Moreover the Difference between the Duties upon Imported Goods in the said 2 Ternaries is 5071*l.*, which multiply'd by 4 gives 20284*l.*, The probable Value of the extraordinary Quantity of imported Goods. Now deducting the said 20284*l.* out of 188,112*l.*, the Remainder is 167,828*l.*: the probable Value of the Goods exported above what was imported.

Observations on the Table C.

That the whole Revenue is more in the Lady-Day-Quarter 1687, than in the same Quarter 1686, by about $\frac{1}{11}$ Part. But the Revenue upon the particular Branches of Prisage, Excise

upon Beer and Ale, with that of Ale and Wine Licences is sunk about $\frac{1}{12}$ Part¹.

So as the Six Diminutions (some whereof are more or less reparable) do amount in all to Ten Millions and 927000*l.*² the Interest whereof at Ten per Cent. is a Million 92000*l.* Now as the said Interest is in Proportion to the whole Expence of the Nation (which I take to be Six Millions and $\frac{1}{2}$ for 1300 Thousand heads at 5*l.* each) so the said Expence must hereafter shrink, vizt from 7 to 6, and so must such Part of the King's Revenue also as dependeth thereon.

Since the Making of these Tables, it has been certify'd from Dublin, That the Customs of that Port were in Midsummer Quarter A^o 1686, 13378*l.*, and the same Quarter of the Year 1687 They fell to 10259*l.*, and that the Excise upon Beer and Ale fell in the same Quarter in that City 947*l.*, or one Sixth Part of the Whole: Altho' the Prisage of Wines encreased from 204 to 278, in the same Time.

It has been also written that, in the West of Ireland, the Yearly Rent of Lands have fallen from 5 to 3, and that within the last 2 Years the Excise of Beer and Ale in and about the same Lands, has fallen from 29*l.* 10*s.* to 7*l.* 2*s.* All which does too well Justify the Conjectures, which have been here made concerning the Decays of Ireland, as may better appear by the small Table here inserted, with the Births and Burials.

Dublin Midsummer Quarter

Anno	Customs	Excise	Burials	Baptisms
1686	13377	5741	503	219
1687	10259	4794	639	310

¹ End of the observations upon the tables.

² Petty's six diminutions (p. 583) are:

Lands	7,000,000
Houses	200,000
Cattle	2,000,000
Money	160,000
Beer &	400,000
Goods, etc.	167,000

9,927,000. The total 10,927,000

may have been reached by taking the present value of the cattle (3 millions) instead of the diminution of their value.

We said that the Excise of Beer and Ale is shrunk at Dublin $\frac{1}{8}$ of the whole, or 947*l.* in the Midsummer Quarter of this Year 1687, and more in other Places. Now whereas it is commonly said, That the Cause thereof is, That the Army are all almost Irish¹, and that the Irish drink little Exciseable Drink, contenting themselves with Milk, Whey, &c.

To this I answer, that the $\frac{1}{8}$ of Excise upon Ale and Beer And Ale Licenses is near 15000*l.* per Annum; that the Pay of the whole Army is about 204000*l.* per Annum. That the Soldiers (many of whom have Families) cannot spend $\frac{1}{10}$ of their Pay in Drink, and find themselves with other Necessaries of Meat, Cloths, horses, Arms, &c. out of the rest. That is to say they cannot afford above 20000*l.* for drink² the Excise whereof is about $\frac{1}{8}$ of the same or 2500*l.*, or which is but $\frac{1}{8}$ of 15000*l.*, which was $\frac{1}{8}$ of the Whole. We may say That if all the Irish of the Army drink onely Water, the King's Revenue of Excise would scarce fall $\frac{1}{10}$ ³ for that Reason, nor above $\frac{1}{80}$ Part of the Whole 90000*l.* as aforesaid.

Another Argument for the Impoverishment of the Inhabitants of Dublin, at least for the Lessening their Expence, is the Consumption of Coals their General and Uniform Fuel, which may therefore be a Measure of all other Expence. Now it appears that in the Years 1683 and 1684, that Expence was near alike, but in the Year 1685 (when Fear first seizd the said Inhabitants, who, as appears by the Registered Baptisms, were most Protestants) it shrunk $\frac{1}{10}$ Part; and in the Year 1686 another $\frac{1}{10}$ Part; in all $\frac{1}{5}$. Which answers⁴ the Shrinking of the Customs $\frac{1}{4}$ and of the Excise $\frac{1}{8}$.

The Expence of Coals or Fuel at Dublin⁵.

A ^o 1683	42727	} Tons
1684	42996	
1685	39565	} 42862
1686	35472	

¹ As a result of Tyrconnel's reorganization. Clarendon, *Correspondence*, I. 500, 506, II. 30—31.

² 'for drink' inserted by Petty.

³ I.e. one tenth of the actual decline of £15000.

⁴ 'answers' inserted by Petty in a blank left by the copyist.

⁵ Among the items at the De Clifford sale was a letter from Petty to Southwell (date not given) on the coals burnt in Dublin, together with two papers on the

Having made this Estimate of the Decays in the Whole Commonwealth; I descend to inquire what the Catholicks of Ireland have gained by the late Changes; and Say

1. That the whole Pay of the Army being 204 Thousand Pounds per Ann. I hear that the Catholicks receive about 160 Thousand Pounds thereof per Annum: Which at two Year's Purchase (for Military Employments are not yet worth as many Year's Purchase as they were 4 Years since) amounts to 320 Thousand Pounds.

2. The Lands, for which the Lord Dunsany, Mr Husey, and Mr. Barnwel, have gotten Verdicts,¹ may be worth about 1000*l.* per Ann.

Nor do I believe that ten times the said Summ can be gotten more in the same Manner. Now if the best Titles are worth but 10 Year's Purchase, then the Value of 1000*l.* per Annum, gotten upon such Verdicts, is not worth so much; and their whole Gain of Soldiers and Ejectors not worth above 400 Thousand Pounds.

On the other Hand the Catholicks have lost as followeth (vizt.)

1. The Superfluous Expence abovementioned, amounting for their Shares probably to 350 Thousand Pounds.

2. The Lands belonging to the Roman Catholicks of Ireland A^o 1683, were worth 3 Millions. But if the Generality of Lands have fallen above one half, I question whether their Lands and Houses be not fallen $\frac{1}{2}$ or a Million.

3. If the Cattle of Ireland be now fallen from 5 to 3 Millions, and that above one half thereof did belong to the Roman Catholicks, then they have upon this Account lost above a Million more. In all about 2 Millions 350 Thousand Pounds; but have scarce gotten, and probably will not get

improvement of Ireland. *Catalogue of MSS. the Property of Lord De Clifford, sold by Christie 11 February, 1834, lot 299.* These papers are said to have been bought for the British Museum but could not be found there in September 1895.

¹ The Irish courts as reconstituted by Tyrconnel, ejected a number of Protestants from lands that had been allotted them and gave the lands to Catholic claimants.

‡ of the said Summ. All which in Time may more sensibly appear, altho' the greater Losses of the other Party does for the present Ecclipse this.

We add hereunto a Conjecture of the Causes of these Decays and Diminutions.

The Causes in General are Frights, Fears, and Jealousies: For the English and Protestants are frighted.

1. To see that for the Sake of Religion (which upon this Account signify'd nothing before the Reformation) that England's Conquest of Ireland is given back to the Irish, as they are apt to imagine.

2. That after Laws are made in England and Ireland, Enacting, That the Insurrection in 1641; The Change of the English Monarchy into an Irish Democracy in 1642; And the Placing Supremacy in the Roman Catholicks; should be Cause of Forfeiture: That those who bear the visible marks thereof should be now trusted with all Civil and Military Power, and probably from Forfeiters be made Legislators.

3. That a Design was Published for making the Roman Catholicks of Ireland as considerable for their Estates as for their Numbers¹: Which in Effect is to take away 11 or 12 Millions of Wealth from the other Party.

4. That the most Zealous Promoters of the Roman Catholic Religion (which, they say, is the onely Means of Eternal Weal or Woe) should make such an Esteem of an Oath (sacred in all Ages and amongst all Nations) as appears in the Lord Dunsany's Trial hereafter inserted².

On the other Hand the English and Protestants have done amiss, to be frighted from their habitations and Business

1. When the King had publickly and solemnly, by his Lord Lievterant, declared to maintain the Acts of Settlement and Explanation³.

¹ See p. 578, note.

² See p. 602.

³ In his speech to the Council when he was sworn into the office of Lord Lieutenant, 9 January, 1686, Clarendon had said, "I have the King's commands to declare upon all occasions that whatever imaginary (for they can be called no

2. When he had declared for an absolute Liberty of Conscience.

3. When the Publick Revenue, especially that of Customs and Excise (being the Pulse of the Nation) were never higher than in the year 1686.

Having entred upon the Consideration of the Decays of Ireland, it may not be impertinent to consider also (being a Thing much talked on) the Number and Quality of the Brittish and Protestants, who have lately quitted that Countrey; as apprehending much Danger in the Change from the Army and Civil Government, which have happen'd there. In order whereunto, I frame this General Question (vizt) What would be the Damage and Detriment to the Common-wealth of Ireland, if all the Brittish and Protestants, with their Personal Estates, were removed from thence, That by the Rule of Proportion we may measure the Effects of Removing any Part of the whole, when we come to know that Part.

We have said that the Irish Catholicks are to the Brittish as 8 to 1. We must add that (Generally speaking) the ordinary Wages of English Workmen and Artizans is triple to that of Irish Labourers, which is but *4d.* per Diem; whereas the meanest of the other Sort do earn at least *12d.* So as reckoning one of the English to be equivalent to 3 Irish, the real Proportion between the said Parties will be as 8 to 3, That is to say, the Irish Catholicks will be 8 of 11, and the English in Effect 3 of 11. Wherefore if the value of the Lands in Ireland be 11 Times 11, or 121, Suppose 11 Groats per Acre and 11 Year's Purchase, then after the English are gone the same will fall to 8 Groats the Acre and 8 Year's Purchase; that is to say, to 64 Groats, which before was worth 121 Groats, and become to be but about half the present Value. Which agreeth with what is observed to come to pass in the

other) apprehensions any men may have, his Majesty hath no intention of altering the Acts of Settlement." Clarendon, *Correspondence*, II. 475. Those who were frightened, however, were not frightened altogether without reason, for in the next month after Petty tried to submit the *Treatise* to the King, Sunderland told Barillon that James intended to reverse the Act of Settlement. Dalrymple, *Memoirs*, II. 262.

above Estimate, Which is a Presage Men have already made concerning that Matter.

Moreover, if the Value of the Cattle, Corn, Merchandize, Shippings, and Money of Ireland be about 7 Millions, and that 4 Millions and $\frac{1}{2}$ thereof doth belong to British Protestants, I see no Reason why the Trade, Commerce and Negotiation of Ireland, when 9 Fourteenth Parts of the Stock is carry'd away, should not fall from 14 to 5 also, and become less than $\frac{1}{2}$ of what it is at present: And by this Rule any Diminution of the English Great or Small, may be computed in the Effect thereof upon the Commonwealth.

We have told that one English Workman at a Medium is Equivalent to 3 Irish Workmen: So we may say that one English Soldier in the Heat of the Warr between June 1649 and June 1652, did prove equivalent to 3 Irish Soldiers. For I have heard from the Muster-Rolls that at the End of the Warr A° 1652 and 1653, the English Army in Pay was about 17000; unto which Number it moldred away from 23000 at the Landing of Cromwel: And I have heard that about the same Time 34000 Irish Soldiers and Soldierlike Persons, did go beyond-Sea; and if half that Number did stay behind, the whole Irish Forces were 51000, or triple to the 17000 English aforementioned. And that the said English, in the said 3 Years, did make an Absolute Conquest of the whole Irish Nation, and all their Adherents, is most manifest. I further add, that the Irish Nation in that Time, that is to say, of Men between 16 and 60 Years old, was 12 Times the Number of the said English Army. All which is said rather to give a just Value to the English, than to disparage the Irish, who have fought against other Nations at even hands.

To strengthen then my Assertion, that the English Army was but 17000: I further say that every Soldier, who served never so little a while between the 6th of June 1649, and the 26th of September 1653, had a distinct Debentur stated for his Service: Upon which it appears how many of them dyed in that Time, besides those that went off upon other Occasions. Now the whole Number of such Debenturs being but 33000,

there is no reason to think that there was in pay above 17000 at a Medium at any one Time.

As to the Body of the English, we shall by the subsequent Accounts of Foreign Trade make it probable, That $\frac{3}{4}$ of the Foreign Commerce and Manufacture is managed by them. We further add that all the Real and Personal Estate of Ireland being worth about 20 Millions, that onely $\frac{1}{4}$ thereof doth belong to the Irish (vizt) 3 Millions worth of Land, and 2 Millions-worth of Cattle and other Commodities. All which is said that how much soever it be thought fit to magnify the Irish, that the English there be not mistaken to be despicable.

Wherefore it may well enough become this Place, to take a gross View (which I heartily beg those who better understand Trade to examine and correct) of the Foreign Trade of Ireland, as it stood in the Year 1685, beginning with the Exportations. vizt.

1. There were exported 1054 horses, which (I suppose) were bred by the English of Ireland.

2. There were exported 2080 Fitches of Bacon, 2514 Barrels of Pork, 75231 Barrels of Beef, and 1135 Dozen of Neat's-Tongues: The Salting and Saving all which, I take to have been brought in by the English.

3. There were exported 134712 Barrels of Butter, 2814 hundred Weight of Cheese. Which I take to be the English Manufactory, That which is made by the Vulgar Irish being scarce a vendible Commodity in Foreign Parts.

4. There was exported 84 hundred of Glew, with great Quantity of Ox-horns, Ox-Gutts, and Ox-bones: All which is English Manufacture.

5. There were exported 1435 hundred of Lamb-Skins, 4067 Dozen of Calves-Skins, 1665 hundred of Coney-Skins, 494 Dear-Skins, 4331 Fox and Otter-Skins, 278 hundred of Goat-Skins, 93412 Raw-Salted Oxhydes. All which were exported, because the English for their Paucity, and the Irish for Want of Skill, could not manufacture them to the best Advantage.

6. There were exported 86093 Tan'd hydes, which

certainly was the Manufacture of the English, the Irish being conversant with little other Tanning than that of Leather for Brogues.

7. There were exported 4937 Pieces of New, and 79 Pieces of old Drapery: in making whereof the Irish had little hand.

8. There were exported 629141 Yards of Frize and 24,667 Pairs of Course Stockings: The greatest Part whereof were wrought by the Irish.

9. There were exported 123,703 Stone of Wool, with 725 Stone of Woolen Yarn, sent away to be manufactured in England.

10. There were exported 1851 Pieces of Linnen Cloth, 3825¹ hundred Weight of Linnen Yarn: a great Part of the courser Sort whereof was wrought by the Irish.

11. There was exported 2710 hundred Weight of Candles and 41365 hundred Weight of Tallow: which was the proceed² of about 100 Thousand Oxen, or the Equivalent in Sheep, reckoning eight Weathers to one Ox.³

12. There was exported 4644 Barrels of Beer, 1519 Gallons of Aqua Vitæ, 5240 Weight⁴ of Biskets, 148115 Barrels of Corn: most whereof was the Labor of the Irish.

13. There was exported 3902 Barrels of Herring and hogsheads of Pilchards; 591 hundred of Dry Fish, with 3055 Barrels of Salmon: whereof about 3 Quarters were the Labor of the English.

14. The exported Timber, Plank, and Coopers⁵, were for the most part the Work of the English.

15. There is more Iron exported out of Ireland, than imported into it, and consequently all the Quantity of Iron used in Ireland is made there and that by the English: Neither are the Irish found by Experience so good as the English, even for Cutting, Cording, and Coaling of Wood, nor for raising of Mines, and carrying off the Water from their Pitts.

¹ May be '3835,' the MS. is blotted.

² MS., 'Equivalent,' altered by Petty to 'proceed.'

³ 'Ox' inserted by Petty in blank left by copyist.

⁴ Apparently should be 'hundred weight.'

⁵ MS., 'Capers,' altered by Petty to 'Coopers.'

Lastly, the Feathers, Kelp, Melasses, Train-Oil, Rape-Seed, Wax and Shoos, exported out of Ireland, is almost all the Work of the English.

As for Importations.

1. The Gold, Silver, Copper¹, Tin, Lead and Steel, as also the Iron (excepting Horse-Shoes, and Plow-Irons) is manufactur'd by the English.

2. The Tobacco-pipe-Clay, Slates and Coals is the Work of the English.

3. The most Part of Dying is done by the English, the Irish indeed can use Bog-Earth, Weeds, and some Indico for that Purpose.

4. The Cotton, Grogram-Yarn and 7831*l.* of raw Silk is all manufactur'd by the English, the 18241 Pieces of Callico are brought from the Indies by the English.

5. The 2056 Tun of French Wine and 727 Pipes of Spanish, is for the most part brought in by the English Merchants and Mariners. The 15000 hundred Weight of Sugars, and 3 Millions Pounds of Tobacco, were made in America by the English, and chiefly brought in by them.

6. The 1056 hundred of hemp is wrought into Cordage by the English.

7. All the Gunpowder, and most of the Arms, are made by the English.

8. 2811 hundred Weight of hops are grown for the most part in England, & brought into Ireland².

There be many other important Observations, to be made upon this gross Account of Trade, but not pertinent to this Place.

Supplements.

1. It has been said that there are now several Decays in Ireland.

2. That the Causes of them have been Fears and Jealousies.

¹ 'Copper' inserted by Petty.

² '& brought into Ireland' added by Petty.

3. That the said Fears do chiefly respect some Changes in the late Disposure of the Lands of Ireland.

4. We shall therefore add a few Words, Why the present Settlement of the said Lands is so much suspected, I suppose, by both Parties. But omitting the Angry Part of the efficient and final Causes of this Settlement, as not reducible to Number, Weight, and Measure.

I shall onely say, That my own Fears concerning the Settlement are, and ever were, That the same was not better grounded upon the Accounts, which ought to have been made of the Particulars following (vizt.)

1. How many Acres the whole Territory of Ireland did contain, and how many of them (A^o 1641) did belong to Protestants, and how many to Roman Catholicks?

2. Of the Lands belonging to Catholicks (A^o 1641), how much of the same were in the Hands of Catholicks (A^o 1659) how much more A^o 1664?

3. What the Value of the said Lands were A^o 1641, 1653, and 1663.

4. What the Irish got from the Brittish, or the Catholicks from others, between the 23^d of October 1641 and the 10th of November 1642, in Cattle, Goods, &c?

5. What the new Catholic State got by Land, withheld from the Brittish and the Church between the Year 1642 & 1650?

6. What the Irish got, and the Kingdom lost, by the 34000 Soldiers, sent into Foreign Parts in the Year 1652?

7. What the King gained by the Parliament of Ireland, which made the Acts of Settlement?

8. What he gained by raising the Quit-Rents from the Irish to the English Measure; and by the Year's Value out of forfeited Lands?

9. What was the Quantity and Value of Regicide's Lands, and of the Lands of obnoxious Persons shelter'd by Favourites?

10. What was the Value of Adventures and Debenturs of several Sorts in every Year between A^o 1652 and 1659? And what was the Total of each Sort of Debenturs and

Adventures? And what was the Quota satisfied upon each Sort before the Year 1659?

11. What Proportion did the Pay of 49 Officers bear to that of their Private Soldiers?

12. What Number of English Soldiers appeared by these Debenturs to have perished in the Warr of Ireland between the Years 1648 and 1654? And what Number of the English, who joined with the Irish, were slain in the same Time?

13. What Money and Money's Worth was really sent out of England into Ireland, between the Years 1641 and 1661?

14. What was the Charge of the Army in Ireland, between the Years 1653 and 1664?

15. What was the Number of the People in Ireland A° 1641 and what 1653? And what probably might they have been A° 1653, if the Warrs had not been?

16. What Lands of the Catholic Restorees, gotten into their hands A° 1664, which were not their's A° 1641?

17. How much did Innocents and other Catholic Restorees recover by vicious Deeds?

18. What has been the Charge in all Courts between the Years 1653 and 1664, concerning forfeited Lands? All which might have conduced to better the Explanatory Act made in the Year 1665.

I am also sorry that the Confirming and Finishing this Settlement was not made in England, where the Ultimate Judicature is, Where the Supreme Legislature of Ireland is; And where are 1600 Thousand indifferent Men, not concerned in this Matter.

From which Accounts will arise the Conclusions following, and many others (vizt)

1. That the Parliament of England A° 1642 did allot 2 Millions and $\frac{1}{2}$ of Forfeited Acres for Suppressing the Rebellion: Which was about $\frac{1}{3}$ of the Lands which the Irish Catholicks then had.

2. That A° 1683 the Irish Catholicks had about half of what-ever they had A° 1641; and Brittish Protestants had the rest, being about 2 Millions 400000 Acres.

3. Of the said 2 Millions 400000 Acres, the Soldiers who actually conquer'd Ireland between the Years 1648 and 1653 had 1400000 Acres.

4. That the said Soldiers did consist of 4 Sorts: (vizt) 1st Phanatic English. 2^{dly} The old Protestants of Ireland. 3^{dly} English Cavaliers then wanting Employments. 4^{thly} Some Lukewarm Irish.

5. Of the Fanatic English, the Regicides and Halbiteers lost all; and about 25 others of the chief and most obnoxious Persons lost at least one Third; by sheltring themselves under the Lord Anglesey and other like Favourites: And many of the rest sold their Interest at low Rates.

6. The said Soldiers stated about 33000 Debenturs, amounting in all to 1160000*l.*, which were fairly and openly sold before the Year 1655 for 3*s.* 4*d.* the Pound, at most for 10*s.*, and at a Medium for 6*s.* 8*d.* So as all the said Debenturs might have been bought for 380000*l.*, vizt at about 10*l.* each for 4 Year's Service of every Soldier in that Conquest. The greatest Debentur of any one Man not amounting to above 2400*l.*; and the greatest Man not having so many Debenturs, as would have been sold in the Market for 1500*l.* in ready Money.

7. The Adventurer's Legal Debt was about 300000*l.*, and the Interest thereof to the Year 1653, as much more; and the Insurance to both double to both the said Summs: In all 1,200000*l.* For the Adventurers were to have nothing unless the Rebellion had been suppress'd.

8. The Lands in Ireland now forfeited were worth A° 1641 about 30*s.* the Acre one with another, And but 2*s.* 6*d.* A° 1653. Near 20*s.* A° 1663. About 30*s.* A° 1673. And about 40*s.* A° 1683.

9. The Quit-Rents of Forfeited Lands, were¹ as a Gratuity to the King (after his Restauration and Promises at Breda) were advanced from Irish to English Measure vizt 24000*l.* per Annum: Which at 15 Year's Purchase amounts to 360000*l.* which with 180000*l.* (the Year's Value of forfeited Lands in the Year 1659) did amount to a Gratuity of 540000*l.* for what was worth but 300000*l.* A° 1653.

¹ ? which.

10. The Convention and Parliament, which made the Acts of Settlement, gave to the King 2 Pole-Moneys 20000*l.* for particular Uses, 120000*l.* as a Supplement to the Year's Value, 35 Subsidies of 15000*l.* each: Amounting in all to near 1,200000*l.*

11. The same Parliament also settled upon him a Revenue of near 60000*l.* new Quit-Rents, 30000*l.* Hearth Money, 120000*l.* Customes¹ 70000*l.* Excise, and 10000*l.* Licenses for Selling several Sorts of Drinks. In all a Revenue of 290000*l.* per Ann. and near Quadruple to what it was before the Warrs.

12. The British Protestants lost by the Robbing and Plunderings of the Irish between 23^d of October 1641 and the 10th of November 1642² For their personal Estates were then worth above 2 Millions, and the Irish were 10 for one.

13. The new Catholic State gained between the Years 1642 and 1650, by Usurping of the King's Revenue, of Church-Lands and Livings, and the Sequestration of the Protestant's Estates³: For the Premisses were worth above 500000 per Ann. and the said State reigned above 8 Years.

14. The Irish Nation gained, and the Kingdom lost, by the Exportation of 34000 able-body'd Irish-men, transported about the Year 1652: For such Men are worth here above 80*l.* per head, at Algier above 40*l.*, and as Negroes above 20*l.* per head.

15. The Lands restored to the Catholicks after the King's Restauration were worth more than in A^o 1653 by 1200000*l.*

16. The Charge of the Army in Ireland, between the Year 1653 and 1663 was about equal to the Rent of all the forfeited Lands in the said Time.

17. The Money and Money's Worth, actually sent out of England into Ireland between the Years 1641 and 1661 was much above a Million.

18. The People of Ireland were fewer in the Years 1653 than they might have been by about 600,000 Souls; by reason

¹ '120,000*l.* Customes' inserted by Petty.

² Opposite this line a 'q' in the margin of the MS.

³ No 'q' in the margin at this point.

of the Sword, Famine, Plague, Banishment, and Desolations, which happened between the Year 1641 and 1653.

19. There were in the Year 1653 about 260000 Catholicks Males in Ireland of above 16 Year's old : whereof but 26 (or one in Ten Thousand) did prove their constant good Affection to the Parliament of England ; and we never heard of 26, which did Publickly and solemnly protest against the Confederation of the Roman Catholicks, in their General Assembly or Supreme Council.

20. The Usurpers, by their Act of Settlement made A° 1652 excepted many Protestants as well as Papists for Life and Estate ; took nothing from Papists who proved their good Affection to themselves ; took a 5th Part even from Protestants, who could not prove such Affection, and were deficient in this Point : Whereas the Act of Explanation retrenched a 3^d even from the most legal Adventurers.

21. The Pay of the 49 Officers amounted to above 1200000*l.*, and consequently the pay of the Private Soldiers and the said Officers together must have been 3 Millions and a half or 500000*l.* per Annum, for the Seven Years between the Beginnings of the Commotions A° 1641 to the Peace of 1648, which shews their Army to have been above 20 Thousand Men.

22. Now the eight Part of the Irish being onely nocent, as appeared by the Judgment of the Court of Claims, did beat the said English Army of 20000 Men into the Peace of 1648 ; Whereas we have shewn That about 17000 Men did conquer all Ireland in Three Years : All which not standing well together, we rather think That a Great Part of the Innocent Seven Eights became so by foul Play, or false Testimony.

23. And because the Innocents, being a fifth Part of the Claimants, carry'd away above a fourth Part of the whole Land, we may think that the said Innocents got by foul Play also much more than was their own A° 1641.

24. The Court of Qualifications at Athlone, was the same Thing, tho' by another Name, with the Court of Innocents at Dublin A° 1663 ; And in this Court all Claims were heard ;

and the Claimants carry'd away above $\frac{1}{2}$ Part of all the Lands, which belonged to Catholicks in 1641 and the Courts after the King's Restauration gave them near 2 sixths more, In all near one half in Quantity, but worth four Times more than the whole was worth in the Year 1653.

25. The Lands, which belonged to Protestants in the Year 1641, were then worth about 4 Millions; but in the year 1653 scarce worth 400000 \textsterling , by reason of the Commotions begun by the Irish. So as the English were damnify'd 12 Times as much as the forfeited Lands (sett out to the English) of all Sorts were worth in the said Year 1653.

Memorandum, That several Blanks are not here filled up, and several whole Conclusions are omitted, for fear of Widening the Breaches we hope to make up: Nor had so many Conclusions been inserted as are, but that the Peace, we hope for, must be founded upon the Knowledge of Truth.

The other Fright of the English is, that by Partialities in Judicature, they are like to lose their Estates without Reprisals; in such a Way as endangers all Property, and as will damp Buying and Selling, Borrowing or Lending, Marriages and Settlements, and (at length) even Plowing and Sowing, till the Nation come not onely to Poverty, but to Brutality also. There have 5 Ejectments been brought this Year (whereas 500 have been talked of, and which probably will amount to 30) whereof 3 have been already tryed: vizt. That against Dr. Gorges, that against Major Bull, and that against Mr. Napper by the Lord Dunsany. The latter whereof is onely come to my Knowledge, and is comprehended in the following Discourse.

The Lord Dunsany's Case.

Of the Lord Dunsany's own, and of his Father's and Grandfather's Wrongs and Oppression in Ireland, since the Year 1662, and of his Relief Anno 1687.

[An account of the legal details of this case, here omitted, begins on folio 118 and extends through 125^v of the MS., which then takes up the last of the "objections."]

The Eighth Objection, That notwithstanding all the Fallacies and Sophistries abovementioned, this Transplantation of People is an uncouth, wild, monstrous, and Chymerical Notion, yea a very Notion.

Answer

And so were not long since the Assertions following, vizt.

1. That tho' the World thought there had been near twice as many Females as Males in Mankind; yet it has been well proved that there are at London 14 Males to 13 Females, and at Rome 7 to 5¹: And because Males are prolific 40 Years and Females but 25, there are in Effect at London 560 Males for 325 Females, or 112 for 65.

2. That the City of London is now about quadruple to what it was 80 Years ago, and contains about the 10th Part of the People of the whole Kingdom.

3. That in the famous hospital at Paris called L' hostel Dieu there dye above 3000 per Ann. unnecessarily, to the Damage of France of above 200 Thousand Pounds Sterl. per Ann.

4. That London has more People than Paris, Rome, and Roven.

5. And as many as the whole Province of Holland.

To all which no great Matter has been yet Objected.

I further answer That this Essay is not a Chymerical Conceit, spun out of Fables, Dreams, Visions, Mysteries, insignificant Words and supercilious Sayings; but a real Notion grounded upon Matter of Sense, and Fact, and intelligibly thus express'd (vizt)

1. That this Transplantation will increase the Gain of England from Foreign Parts from 1 to 2.

2. The Value of Ireland from 2 to 3; as also lessen Ireland's Present Decays, which are from 3 to 2.

3. Will raise the Value of Lands in England from 3 to 4.

4. And the King's Revenue from 4 to 5, but make the same as easie, as if it had contrariwise fallen from 5 to 4.

5. The Value of Transplanted People from 7 to 10.

¹ Proof of this assertion does not occur in Petty's printed works.

6. All which put together exceeds 140 Millions, and cures a cruel Calamity of above 500 Years old.

To Conclude, if this Notion (such as it is) pretending to so much General Good, shall not be examined and confuted within some reasonable Time, we shall be emboldened to frame another Essay

Shewing that the King of England's Territories and Subjects are (as to their intrinsic Weight, Force, and Substance) little inferior to the same of France, without any Detraction from that Glorious Kingdom¹.

Postscript.

If in this Jealous Age this Essay should be taxed of an Evil Design to Wast and Dispeople Ireland, We say that the Author of it intends not to be *Felo de se*, and propound something quite contrary, by Saying it is naturally possible in about 25 Years to double the Inhabitants of Great Britain and Ireland and make the People full as many as the Territory of those Kingdoms can with tolerable Labor afford a competent Livelihood unto: Which I prove thus, (vizt)

1. The sixth Part of the People are teeming Women of between 18 and 44 Years old.

2. It is found by Observation That but $\frac{1}{3}$ Part or between 30 and 40² of the teeming Women are Married.

3. That a Teeming Woman, at a Medium, bear a child every two Years and a half.

4. That in Mankind at London, there are 14 Males for 13 Females, and because Males are prolific 40 Years, and Females but 25, there are in Effect 560 Males for 325 Females.

5. That out of the Mass of Mankind there dyes one out of 30 per Annum.

6. That at Paris, where the Christnings and the Births are the same in Number, the Christnings are above 18000 per Annum, and consequently the Births at London, which far exceed the Christnings there, cannot be less than 19000 where the Burials are above 23000.

¹ Perhaps the *Political Arithmetick*.

² i.e. in 100.

As for Example.

Of 600 People, the Sixth Part (vizt 100) are teeming Women, which (if they were all marry'd) might bear 40 Children per Ann. (vizt) 20 more than do dye out of 600, at the rate of one out of 30; and consequently in 16 Years the Increase will be 320, making the whole 920. And by the same Reason, in the next 9 Years, the said 920 will be 280 more, in all 1200, vizt double of the Original Number of 600.

Upon these Principles, if there be about 19000 Births per Ann. at London, the Number of the marry'd teeming Women must be above 38000; and of the whole Stock of the Teeming Women must be above 114000, and of the whole People Six Times as many vizt 684000; which agrees well enough with 696000, which they have been elsewhere computed to be¹.

To conclude it is naturally possible, that all teeming Women may be marry'd, since there are in Effect 560 Males to 325 Females; and since Great Britain and Ireland can with moderate Labor² food and other Necessaries to near double the present People or to about 20 Millions of heads, as shall when Occasion requires it, be demonstrated.

Memorandum, that the Council or Judicature abovementioned to be final for Ireland, may serve also for Managing the Multiplication of the King's Subjects, and may withal be a Means to perpetuate and secure the Universal Liberty of Religion late indulged by his Majestie; May take care that humor and sinister Designs be not obruded upon the Government as Tenderness of Conscience; Nor that the said Latitude in Divine Worship and Profession of Opinions concerning Spiritual Matters, and what concerns the World to come, may not in this World destroy the Unity, Peace and Plenty, of the People. And all this under the King's Authority, This Council being supposed to have none of it's own, altho' it be *Vox Populi*, and as near as may be, the very Church of England.

¹ Pp. 532—536.

² Sc. 'produce.'

ANOTHER VIEW OF THE SAME MATTERS, BY WAY OF
DIALOGUE BETWEEN A AND B.

A. How many Acres of Land, belonging to the Catholics of Ireland A° 1641, are now, in this year 1687, enjoyed by the English Protestants?

B. Two Millions 400000 Acres, as appears by the Books of Distribution, extracted out of the Decrees and Certificates of the Court of Claims.

A. What is the Value of the said Lands?

B. I do not know what their Value is in this Year 1687, but in the Year 1683 (having bin extremely improved) I guess they might have been worth near 40s. the Acre, and A° 1641 and 1673, about 30s. the Acre, A° 1663 about 20s. & A° 1653 about half a Crown.

A. With what Face can you say they were so Cheap?

B. It is Notorious and expressly mentioned in the Acts of 17th Charles the First; as also in the Usurper's Act of Satisfaction made A° 1653, That the Lands in Leinster should be rated at 12s. per Acre, in Munster at 9s. in Connaught at 6s., and in Ulster at 4s. So as 4 Acres set out by Lot (one in each Province) should go for 31s. in Debentur-Money, which makes but 10s. in Silver-Money. Now if 4 Acres be worth but 10s. one is worth but 2s. 6d.

A. This is very hard to be believed. Have you any other Proof?

B. Yes for 4 Millions 800000 Acres A° 1659 were by Solemn Commission returned to be worth but 180000*l.*, or 9*d.* the Acre: And if they were worth but 9*d.* the Acre A° 1659, they were not worth 5*d.* per Acre A° 1653, nor above 4¹ Year's Purchase at that Rent, viz. not above 20*d.* per Acre even for the Inheritance: Which by Experience is nearer the Truth than half a Crown.

A. I am amazed! I Believe, but help my Unbelief, and tell me what was the Reason of what you say.

B. At that Time there was no Housing, nor Cattle upon

¹ '4' inserted by Petty.

the Land, little Money or Trade in the Nation, no sure Titles; Soldier's Debenturs were taken for a Jest: And the whole Government and Army in the Hands of Anabaptists.

A. Well, I am satisfy'd that all the said Lands might fairly and squarely have been bought for 300 Thousand Pounds in ready Money. But pray, Who did Claim them before the Acts of Satisfaction 1653.

B. You will wonder and Laugh to hear my Answer.

1. For the Adventurer said, that his equitable Debt was in Principle Interest and Insurance 1200000*l.*, and Quadruple to the Value of the Lands, But that his Legal Debt or Original Money was equal unto it.

2. The British Protestants, who were plundered A° 1642 by the Rebels, said that the Goods, Money, and Cattle, which they lost, were worth 600000*l.*, as appeared by Examination upon Oath, besides the Interest thereof for 10 Years. And therefore that all the said 300000*l.*, worth of Forfeited Lands belonged unto them and not to Strangers.

3. The owners of Ruined Housing said, That their Damage, in the 12 Years of the Warrs, amounted to Six Times the then Value of the said forfeited Lands.

4. The Owners of the Cattle, which had been destroyed in the said 12 Years (for very few were left) said that their Value amounted to at least 3 Millions, or ten Times the Value of the said Lands.

5. The Army, who serv'd from the Year 1641 to the Year 1648, and the People that fed them, pretended to a Debt of 3600000*l.*

6. The State and People of England said they had actually sent over 1200000*l.*, or 4 Times the Value of the said Lands.

7. The Protestant Land Lords of Ireland said, that their Lands A° 1641, were worth above 4000000*l.*, and A° 1653 but 400000*l.*: So as they were damnify'd 12 Times the Value of the forfeited Lands.

8. The Protestant Churchmen said, That their Lands and Tyths, which the Catholick's State had Usurp'd during the 8 Years of their Reign, amounted at least to 900000*l.*, or 3 Times the Value of the forfeited Lands.

9. The King (or those who Usurped his Right) said that

the Public Revenue, taken by the said new State for the said Time, amounted to 5 or 600000*l.* That the Value of the 34000 Men, sent into the Service of Foreign Princes, were worth above 1200000*l.*, and that the 600000 Subjects, which the Kingdom had less in the Year 1653, than they might have had (had not the Warrs begun by the Irish hinder'd their Increase) at 70*l.* per Head, were worth 42 Millions, or 140 Times the whole Value of the Forfeited Lands.

10. Lastly, the Soldiers who actually conquer'd Ireland said that their Debenturs amounted¹ 1160000*l.*, or Quadruple the Value of the Forfeited Lands.

A. Oh, I am amazed, It seems to me that all these Claims do amount to near 200 Times the Value of the Forfeitures.

B. They do so. But perhaps they will say, The Number of the King's Subjects lessen'd by the Wars, was not 600000 Heads. I believe, indeed, the Value of each Head at a Medium is about 70*l.*

A. And so do I. But pray make it out that the Number of wanting Subjects is 600000.

B. I cannot well undertake it, but will tell you what I remember to have heard upon this Subject, vizt. It is allowed That the present Number of People of Ireland is 1300000, That they are increased, since the Year 1653, by Comers out of Scotland and England, 50000²; And by the ordinary Course of Generation in 34 Years 350000 more.

A. I find by Grant's Observations, That they do not increase in England so fast.

B. Very likely. For in England, the Proportion of Marry'd Teeming Women, is not so great as in Ireland; Where they marry upon the first Capacity, without staying for Portions, Jointures, Settlements, &c. Well, let it pass for the present, That the People A^o 1653, were 900000, I will prove it better at our next meeting. I say further, That the People A^o 1641 were 1400000, And that they would have increased, had not the Warrs hindered, to 1500000 in the 12 Years between 41 and 53, and the Difference between 15 and 9 is 600000, as was propounded.

¹ Sc. 'to.'

² MS., '50000' altered to '50000.' Nevertheless 500000 is the figure consistent with Petty's calculation, cf. pp. 610—611.

A. You go a little too fast. I believe that 14 in 12 Years might have very well increas'd to 15. But pray tell me, Why there were 14 A° 1641, when there are but 13 now.

B. (1) I have heard many ancient observing People say so. 2. I find that the Tyths yielded more in A° 1641, than in these latter Years; And that the Number of Grist-Mills were also more A° 1641, than now. 3. The Quantity of Hops, Tobacco, Sugars, and Salt, imported, were more than now. And the Quantity of Hydes, Tallow, Cattle Dead and Alive, and of Wools wrought and unwrought, were less; which shows that in Ireland the Consumption was great (the Natural Produce being the same at both Periods) & consequently more People.

A. I can find no great Fault with what you have said. But cou'd wish that this great Point might not be slubber'd; Murders and Massares (*sic*) are odious Crimes. And some say, to Blacken the Irish, that they caused the Death of above 150000 English and Scotch Protestants in the first Year of their Commotions. And others, to extenuate the Causes of Forfeiture, do shrink that Number to 400¹. But you have started a most soft and candid Question, by Asking onely, without Rancor, How many of the King's Subjects were fewer in Ireland, when the Warr ended, A° 1653, than they might have been, if there had been no Warr at all, That is to say, Whether they perished by Murders and Massacres committed by Private Hands, or by Hunger and Cold, or by being frighted out of the Kingdom; or Whether they were slain as Soldiers on both Sides; or Whether they perished by the Plague, which reigned very fiercely A 1650; Or by Famin² and Desolation, which was great about the End of the Warr; Or whether this Number were Lessen'd, by Hindring the Ordinary Course of Generation: For it is all one, by what Means they were Lessen'd, as to the Account we are now Stating, Of the Damages which accru'd from the Rebellion. Altho' it be not all one, as to the Sin of the particular Scelerates, which caused this Calamity.

¹ MS., '4000,' altered to '400.'

² MS., 'Fame,' altered to 'Famin.'

B. What if I had said but 300000 instead of 600000, the Loss even of 300000 People, is more than all the Estates of the Irish Real and Personal, at their greatest Worth and Splendor, can expiate. Nevertheless, because it is a curious Inquiry, and to shew you that I do not talk altogether at Random, I will repeat and strengthen the Demonstration I began; vizt.

1. That there [are] about 1300000 Souls in Ireland in this Year 1687. I say that the Revenue of Hearths is 30000^l., So as the Hearths must be 300000 in Number. I say that, by a good Estimate from the Hearth-Books, all the Houses in Ireland, which have more than one Chimney are 20000; and that there dwell 6 Heads in each of such Houses, one with another: In all 120000 Souls. And that there are in the said Houses 3 Chimneys one with another, in all 60000 Chimneys: Which deducted out of 300000, leaves 240000 chimneys for 240000 Thousand Families. But in the poor Cabineer Families, one with another, there live 5 Heads in each; which makes the Number of those Cabineers 1200000: Which added to the 1200000 (*sic*) abovementioned, makes 1320000 Heads, which is the next round Number to 1300000.

2. Let me suppose that there were 900000 People in the Year 1653, and 1300000 now, then at a Medium there were 1100000: Out of which there dyed, at the Rate of one out of 30, 37000¹ per Annum. Grant saith² that in Countrey Parishes, where there are 4 Burials there are 5 Births; and consequently the Increase of the People in Ireland must be the Quarter of 37000 or 9000 one Quarter per Annum: Which multiply'd by 35 makes 315000 to have increased by Generation, between the Year 1652 and 1687, and the Number in 1652 to be 985000.

3. Altho' I said there were more People A^o 1641 than A^o 1687, as appears by the Exportations, Importations, Tyths, Grist-Mills, and the Judgment of Intelligent Persons; Yet I shall suppose them to be but one 13th Part, or 1400000 in all: But 1400000 would have increased from the Year 1641 to the Year 1653 11500³ per an or 138000, making the whole

¹ MS., '17000.' Petty wrote the '37000' in the margin.

² P. 390.

³ MS., '11000,' altered to '11500.'

1538000. Now the Difference between 1538000¹ and 985000¹ is 553000¹. So as of the 985000¹ last Mentioned we need suppose but 470000(*sic*) to have come out of England and Scotland in 35 Years; And then the Assertion, that the King has lost 600000 Subjects by the Irish Commotions is well justify'd.

I know these are not so perfect Demonstrations as are required in pure Mathematicks; but they are such as our Superiors may work with, as well as Wheelwrights and Clock-makers do work without the Quadrature of a Circle. For to have been more Nice or Punctilious in them, had been the same Excess, as if a Painter should work a large high Altar-Piece in Miniature: Whereas the gross Image of this Affair lyes in Saying, that the Irish changed the Monarchy into Democracy, which cost the Crown of England 600000 People, worth 42 Millions of Money.

A. You have said more than I thought could have been said: But remember, I must have another Bout with you about this Matter. You told me how many Claimants there were for this 300000*l.* worth of Forfeited Lands: Pray proceed to tell me how the same was Actually dispos'd of by the Acts of Settlement and Explanation, keeping to the Supposition, That the Whole was but 300000*l.*

B. You come a little too suddenly upon me; I cannot tell you all these Things without Book, but will give you the best Guess I can, which is

1. That the Adventurers (of the said 300000*l.*) had 43000*l.*
2. That 155000*l.* were given to the Soldiers.
3. That out of the Adventurers and Soldiers which had been Regicides, 20000*l.* was given to the Duke of York; and that Obnoxious Men of both Sorts gave 4000*l.* to be shelter'd by Favourites.
4. The Church and Colledge of Dublin, and other Publick Uses had about 8000*l.*, and the 49 Officers 32000*l.*
5. Protestant Sufferers, Servitors, and Favourites had the rest, or 38000*l.*

A. But what did all the Claymants, you just now mention'd, say to this Shrinking of their Hopes into a Welshman's Button?

¹ MS. in each case has a superfluous o erased by Petty.

B. They rail'd at the present Settlement and said, That the Usurpers needed not to have been so kind, as by their Act in 1652 to give away above $\frac{1}{2}$ Part of the Whole to the Catholicks, who forfeited all in Lump as one Man, eo Nomine; Tho' not for going to Mass or Confession, nor for Praying to Saints or for the Dead; But for Changing Monarchy into Democracy, for placing Supremacy into a Council of Confederate Roman Catholicks, and for Extorting from the King (in duris) the Articles of 1648. For the Usurpers themselves touch'd no man for his Religion, and punish'd Protestants and Papists equally, whom they found disaffected unto them; and thought Difference in Religion to be no more a Cause of Forfeiture, than an English Ship's carrying a Flag with a Red Cross to an Enemy-Nation. But no doubt the Usurpers had an End for this their Indulgence, as in the Preamble of the said Act is set forth. For they gave all Men Leave to Claim upon their Qualifications, and the 8th Qualification was the same with Innocency; and all Complainants (for ought I know) were heard, and had Decrees at Athlone of one Sort or other.

A. This was a scurvy Grumble to begin withal: What else did they say?

B. I told you there were several Species of Claimants, whereof some Grumbled one way and some another. As for Example: Some thought they had been confirm'd, by the King's Promises at Breda, in what they possess'd the 7th of May 1659, without further Trial of Innocence¹, after a Present given the King of 540000*l*. Others thought that the Acts of the Rump-Parliament were, as to this Matter, completely warranted by the Act of 17th of Charles the First, and that of Judicial Proceedings, which Doctrine the English Act of Oblivion seems to favour; Others wonder'd to see 7 of 8 Irish Claimants adjudged Innocent, and that very suspicious Deeds of Entail [were] allow'd to the Sons of Outlawed Persons; That English Strangers should be put to prove what was done 20 Years before in the Rebels Quarters, and be deny'd the Testimony of the 49 Men for that Purpose: And in Fine, That about 1500000 Acres of Land should be restored upon

¹ MS., 'Innocents,' altered by Petty.

such Innocents, and upon such Titles, and upon Provisos of mere Grace. Lastly, others grumbled, That the Irish should so vehemently crave a further Hearing of all their Claims; and such Sherifs and Juries should be chosen, as shall allow the Deeds which the Irish have suppressed For¹ 20 Years. There be many other Grumblings against Great Men; but the World will never be quiet, nor cease to be Envious, not considering that if Things have been amiss in this Settlement, they may be as bad in another.

A. You were saying that there was Grumbling against Great Men, upon the Account of the present Settlement. I remember that the Narrative of the Sale and Settlement of Ireland² grumbles hard against the Duke of Ormond, as for having as much Land, as would have satisfied all the Adventurers, in or about the Year 1667, when that Pamphlet was written. Can you make me understand this Matter, for it seems very Enormous, and by that I might make a Judgement of the whole Book.

B. That Author does often speak at random, and what he does not know; omitting very many Things which ought to be known. But to this³ Present Point I say, 1. That the Acres, which the Adventurers first had, were 390000⁴; and I do not find that the Duke of Ormond had ever above 3

¹ MS., 'these,' altered by Petty.

² A *Narrative of the Earl of Clarendon's Sale and Settlement of Ireland* was published at Lovain in 1668. The author appears to have been Nicholas French, titular Bishop of Ferns, though Carte attributes it to Peter Talbot. *Life of Ormond*, II. 384. The pamphlet, which I have not seen, is said to attack Ormond and Clarendon with great bitterness, to asperse the entire English interest in Ireland, to praise the Irish extravagantly, and to suggest the repeal of the Act of Settlement. It appears from Petty that the pamphlet was reprinted in 1686, but Lord Edmond Fitzmaurice, who attributes it to one Edward Fitzgerald, writes as if it were first published in that year. *Life of Petty*, 272. Petty was urged to reply to the *Narrative*, as being one especially acquainted with the settlement of Irish land-titles. He at first demurred, but finally wrote his *Speculum Hiberniæ*, dated 1686, and *Another more true and exact Narrative of the Settlement and Sale of Ireland*, dated 1687. The *Dialogue*, too, appears to be directed in part against the *Narrative*, and chiefly against its assertion that the Catholics in Ireland had lost and the English protestants had gained by the events between 1641 and 1665.

³ MS., 'the,' altered by Petty.

⁴ MS., '300000,' altered by Petty.

Quarters of that Number in his Hands of any Sort, or in any Sense.

2. That if he then had 30000 Acres in his Hands, above 20000 thereof was the course Lands of Kerry; upon which he had onely some Chaffages¹.

3. That the said Lands were indeed 20000 Acres, but it was by the erroneous Measure of the extream² Column: Whereas they contained indeed scarce 30000 Acres by the Legal Measure of the reduced Column, according to which very Measure, they were not worth 2s. per Acre before the Warrs.

4. His Grace, upon Trial of the Matter in the Court of Claims, quitted these Lands to those who had Right in them, a little after the Author wrote. So that in Truth, upon the whole Matter, this vast Scope of Kerry-Lands would not have made above $\frac{1}{40}$ Part of the Adventurer's Satisfaction, which that Author conceived might have been a full Satisfaction to them: And as his Grace was abused by this Narrative, so was he also by them who put him upon Meddling with those Lands at all, which he held about 5 Years upon their Sinister Perswasions.

A. I instance, in the next Place, the horrible Grumbling against S^r. W^m. Petty as an exorbitant Gainer by the said Settlement. Can you say any Thing of him?

B. That Man has been 35 Years upon the Stage of Irish Affairs, so as a Volume might be writt concerning him. But the Answer to your Question may be short, vizt. That Gentleman made an Admeasurement of Ireland in the Year 1655 and 1656, now fairly recorded in his Majesty's Surveyor General's Office, by distinct Maps of every Parish; and also Printed and Published in distinct Maps of every County and Province. And the same was appointed to be done, not onely by the Usurper's Acts, but even by the Act 17^o Car. Ist and the Work was confirmed not onely by several Years of Probation during the Usurper's Government, but also by the Acts made in Ireland since the King's Restauration; and

¹ MS., 'Cheiffryes,' altered by Petty.

² 'Extream' inserted by Petty.

³ MS., 'of,' altered by Petty.

more particularly, after ten Year's Examination of the same by the Act of Explanation in the 22^d and 23^d Pages thereof: And hath been before and since the Rule and Standard of the greatest Transactions in Ireland.

This Survey was performed by Measuring as much Line by the Chain (and Measuring about 20 Angles within every Mile's Space by the Circumferenter) as would encompass the Globe of the Earth 8 Times about in it's greatest Circle. Now if we may allow him to gain 1000*l.* for Measuring each Time about the World (his Accounts amounting to 9000*l.*) then the said Gain, lay'd out in forfeited Lands at half a Crown the Acre (which was the fair Market-Rate, as hath been elsewhere proved) then St. W^m. Petty might have 70000 Acres for his Work, worth at 2*s.* the Acre 7000*l.* per Ann.

Memorandum, That if he had gotten more than is here mentioned, he need not have been a Knave thereby: For he had A^o 1657 4000*l.* in Money more than the 9000*l.* that he got by the Survey. But if he has a less Estate than aforesaid, he was a Fool or unfortunate *pro tanto*. I further say, That the Lands belonging to the Catholicks A^o 1641 were near 5 Millions of Irish Acres, or 8 Millions of English Acres profitable, with 3 Millions more in Rivers, High-ways, Loughs, Bogs, Rocks, and barren Mountains. And the Charge of the said Admeasurement was 24000*l.* or little above 40*s.* per Thousand Acres, and little above one half-penny per Acre Rough and Smooth. And if the said Survey be computed at 200000 English Miles, which will encompass the World 8 Times about; Then, allowing half a Crown or 2*s.* 4*d.* for Measuring an English Mile (with perhaps 20 Angles in the same) or about Ten Groats for an Irish Mile, the Charge of the said Survey¹ will not amounts (*sic*) to 25000*l.*, which is more than was given for the same.

A. Pray proceed to the Cases of other Men, who have got great Estates by the Settlement.

B. In answer to your Desire, I will name you about 25 of the greatest Gainers by the Settlement: Protesting against having any Prejudice against any of them. And must first

¹ MS., 'same,' altered by Petty to 'said Survey.'

tell you, That the King has about 56000*l.* per Ann. by new Quit-Rents out of the Forfeitures; that of the Catholicks the greatest Gainers are the Duke of York, Earl of Clancarty, Earl of Inchequeen, Earl of Tyrconnel, Earl of Carlingford, the Lord of Clare, the Lord Dillon, Coll. Matthews, & M^r. John Brown of Connaught.

2. That of those, who lived in Ireland before the Rebellion, the most considerable were the Duke of Ormond, Earl of Anglesey, Earl of Orrery, Earl of Montrath, the Lord Chancellor, the Lord Lansborough, the Lord Kingston, Lord Coloony, S^r. Theophilus Jones, S^r. Maurice Eustace, and Aldermⁿ Preston.

3. That of those, who came into Ireland since the Year 1648, the most considerable were the Lord Massareen, Aldermⁿ Erasmus Smith, S^r. W^m. Petty, Captⁿ James Stopford, Mr. John Eyres of Connaught, and S^r. Henry Ingoldsby: some of all which Sorts did their Business by downright Gifts and Grants, Some were forced into great Advantages by Guilty and Obnoxious Persons; Some by the Sheltering and Colouring Vicious and defective Interests; Some by the Trade of Buying and Selling Debenturs, and Adventures, and Connaught-Purchases. So as I verily believe, That of the whole 300000*l.* worth of Forfeitures, there did not remain with the new English A^o 1683 one full Third Part thereof. I mean by the new English, not all those that came into Ireland since the Beginning of the Rebellion, but onely those who came thither between the Year 1646 (when the King's Affairs went to wreck in England) and the Year 1656 (when the Usurpers were in their Meridian), Which Party of Men, altho' they all seem to be Phanatically and Democratically disposed, yet in truth were Animals of all Sorts, as in Noah's Ark.

A. The Narrative of the Sale and Settlement pathetically sets forth, That never any Nation was so miserable as the Irish after their Conquest A^o 1653: Whereas you insinuate, They Gained more than they Lost by the Rebellion.

B. I say by my own Observation, That I never saw so much Merriment and Jollity anywhere, than A^o 1652, among

those that were to be Transported and their Friends. And have heard that the said Transportees lived more pleasantly Abroad than at Home. I also say, That Nine Parts of Ten of that Nation, who lived as Labourers and Tenants, did live more plentifully and freely in the next Seven Years after their Conquest between A° 1653 and 1660, than they had done in the Seven Years next before the Warrs. For they had Lands at small Rents even at $\frac{1}{4}$ at¹ the present, and yet sold their Commodities at greater Rates than now, and, paying their Rents, were as free as their Landlords. Nor do I remember any Man to have been by Authority punished for his Religion in that Time, there being no National Church then established in Ireland.

A. I thank you for your Informations, but cannot digest that Honest-Moderate-Wealthy Catholicks should lose their Estates, for what a Company of Lewd, Ignorant, Barbarous, and Beggerly Rascals did against the English in the Tumultuary Year 1642.

B. Alas it is the Wrath of God, and a Curse upon Mankind, that Things should be so! Is not the whole World engaged in Original Sin, for Adam's Eating the Forbidden Fruit? Do not Princes, by the Allowance of their Confessors, throw Bombs and Fire-works into besieged Towns, which light more upon innocent Women and Children, than upon those who have offended the said Princes, or even upon Soldiers in Arms? The General Assembly of the Catholicks did not punish the Outrages committed in that Tumult by those Scelerates; nor did those Moderate Men (you mention) by Word or Deed protest against their General Assembly, nor the Confederate Usurpers of Supremacy; but had all Secret Hopes of Gaining some agreeable Ends out of those Horrible Beginnings. Are not all Men bound by an Act of Parliament in England, altho' 4 Parts of 5 have no Right to make Members for either House? I am unwilling to drive this Nail too far; Think on what I have said, and let me have your Objections at our next Meeting.

A. Pray, have a little Patience, and as you have now

¹ ? of.

told me what the English and Protestants have lost, so repeat (if you please) what the Irish Catholicks have got by the Rebellion, or what else you will call it?

B. As to the Name Rebellion, I matter it not, That which the Irish did amiss in was, as I apprehend, THE CHANGING THE ENGLISH MONARCHY INTO A DEMOCRACY; The Placing Supremacy into a Confederacy of Roman Catholicks to the Wrong and Blemish of that Religion, and the Extorting from the King (in duress) the Articles of A° 1648: All which is plain-intelligible English of which there is no Doubt.

The Particulars by which the Irish gain'd are these; vizt.

- | | |
|--|-----------------------------|
| 1. By the Robberies and Plunderings of the English before the Gen ^l Assembly. | 600000 £ . |
| 2. By Usurpation of the King's Revenue for above 8 Years. | 500000 £ . |
| 3. By Usurpation of the Church-Lands and Livings for the same Time. | 900000 £ . |
| 4. By Exportation of 34000 Men at 40 £ , per Head. | 1300000 £ . |
| 5. By Improvements upon Restor'd Lands. | 1200000 £ . |
| | In all 4500000 £ . |

Now tho' the Value of the forfeited Lands were A° 1641, 3600000 £ , Yet it must be understood that $\frac{1}{4}$ Parts thereof was lost by Common Calamity, and onely 300000 £ . (the Value of the same A° 1653) was lost by Penalty or Forfeiture, which is but the 15th Part of what they gained, as aforesaid.

A. I do not see that those, that lost their Lands, got any Part of the 4500000 £ , above-mentioned.

B. Truly, I believe not. For I think the 600000 £ got by Plundering, was immediately and lewdly spent by the Plunderers themselves. That the King's and Church's Revenue might have been spent upon the Common Cause. That the Gain upon the 34000 exported Men, redounded to the Exportees themselves, and to their Conductors and Commanders. That the Improvements accrewed to the Restorees onely. But all that is nothing: For all the Confederate

Roman Catholicks, ought to be looked upon but as one Man; who lost by Way of Forfeiture 300000*l.* and gain'd 4500000*l.*, which is 15 for one. Now for Remedy of Inequality among themselves, it may be done by a Court or Council of Catholicks erected for that purpose, as aforementioned, and by the Prudence of Confessors; without Frighting and Disturbing the whole Nation with a perpetual Fear of Unsettlement.

A. I will trouble you no further. The Summ of what I have learn'd is this, That by the Rebellion in Ireland is properly mean't, THE CHANGE OF MONARCHY INTO DEMOCRACY, AND TRANSFERRING SOVEREIGN POWER FROM THE KING TO THE CONFEDERATE CATHOLICKS: And Aggravated by Extorting the Articles of 1648, and not Punishing the Outrages of 1641. And that the said Confederates gained thereby 15 Times more than they properly lost; And that all the several Branches of the English-Protestant Interest lost 200 Times more than they gain'd.

B. You need not now at last be so very short; but (if you please) sum up what we have said thus. (vizt)

1. Between the 23^d of October 1641, and the 10th of November 1642, there was a Barbarous and Outragious Tumult of the Irish Catholicks against the English Protestants in Ireland: Who being then about 10 to one committed many Murders, Robberies, and Mischiefs upon the English.

2. That the 10th of November 1642, and after Edge-Hill-Fight in England, when the King was dangerously ingaged against his Enemies, the Irish changed Monarchy into Democracy.

3. The Roman Catholicks then blemished their own Sacred and Infallible Religion, by Making it a signal Ear-Mark and Brand of Rebellion upon themselves.

4. Their several Cessations and Peaces with the King gave him no Relief to his Distresses in England; But the Latter in 1648, was thought to be a main Cause of his disastrous Death.

5. That the English, in Pursuance of an Act made by the King, Lords, and Commons of England, perfectly

suppress'd that Rebellion in the Year 1653, with an immense Expence of English Blood and Treasure, and the Loss of 600000 People.

6. The actual Conquerors did, by way of Indulgence, give to the Catholicks a 6th Part of all the Lands which belonged to them A° 1641, with the Liberty of their Persons and Personal Estates, punishing no Man for his Religion.

7. They Leased back the Lands, which they got from them as forfeited, at one Quarter of the real Value between 1653 and 1660.

8. The said actual Conquerors surrendred all their Acquisitions to the King at Breda, and made him a Present of 540000*l.*, which, with 60000*l.* spent in Defence of his Title, amounted to double the Value of what they now keep, as A° 1653.

9. An Army was kept up from 1653 to 1663, whose Pay was equivalent to the Rent of all the Forfeited Lands.

10. The Regicides and Halberteers were outed of all their Acquisitions, and many disaffected Persons driven to take shelter under others &¹ to part with their Interests at small Rates.

11. A new Court of Innocence, and Clauses of Grace, give² after the Promises of Breda, one Third more to the Catholicks of all that belonged to them in 1641, with as much Improvement as was worth 4 Times what all the Lands they lost were worth A° 1653.

12. A° 1655, The English retrench a Third of what was most Legally due. But the Irish Restorees nothing.

13. Upon the whole Matter, the Irish Catholicks seem to have gained by these Commotions 15 Times more than they lost ; And all the Branches of the English-Protestant Interest, seem to have Lost 200 Times more than they have Gained.

14. The Parliament of Ireland gave to the King in Pole-Money, Subsidies, &c. within 5 Years after his Restauration, about 1200000*l.*

15. The same Parliament gave the King a Revenue, by

¹ '&' inserted by Petty.

² MS., 'given,' Petty obliterated the 'n' but did not change the 'i' to an 'a.'

new Quit-Rents out of Forfeitures, of near 60000*l.* per Ann. and made his whole Revenue quadruple to what the said was before the Warrs.

16. The Irish Catholicks, by indeavouring to out the English of what they held¹ A° 1684, have reduced all the Real and Personal Estate of Ireland to be Worth but one half of what the same was worth in the said Year 1684, and lessen'd their own Estate above 2 Millions.

17. The Transplantation above-mentioned, which should have been made above 500 Years since, will benefit both Nations 140 Millions; and that of Scotland 60 Millions more: In all 200 Millions at the Hazard of 4 or 5 onely.

A. The Title of your Treatise is *POLITICAL PASTIMES AND PARADOXES*. Now, besides my particular Thanks, I give you this Complement, That the Consideration of these Matters may be Pastimes becoming the King. And your Assertions, concerning the Gain and Loss by the Rebellion (tho' but a 10th Part thereof should be true) is a Paradox in all the Courts of Christendom, where the Narrative of the Sale and Settlement of Ireland has been published.

B. I thank you, and do willingly submit my self to the Censure of the World; and shall take it as a Kindness from any good Patriot, that will solidly confute, that is to say, rectify what I have said amiss, That England (which has the Ultimate Judicature of these Matters) may be throughly informed.

FINIS.

¹ MS., 'had,' altered by Petty.

APPENDIX.

I.

[EXTRACT FROM THE DISCOURSE CONCERNING THE
USE OF DUPLICATE PROPORTION¹, 1674.]

The Eleventh Instance.

In the Life of Man, and its Duration.

It is found by Experience, that there are more persons living of between 16 and 26 years old², than of any other Age or Decade of years in the whole life of Man (which *David* and *Experience* say to be between 70 and 80 years :) The reasons whereof are not abstruse, *viz.* because those of 16 have passed the danger of Teeth, Convulsions, Worms, Ricketts, Measles, and Smallpox for the most part: And for that those of 26. are scarce come to the Gout, Stone, Dropsie, Palsies, Lethargies, Apoplexies, and other Infirmities of Old

¹ The fundamental idea of Petty's "Discourse of Duplicate Proportion" is that certain phenomena, capable of expression in terms of number, weight and measure, stand related to one another as the squares or cubes, or as the square or cube roots of their respective quantities. Petty illustrates his theory by a number of "instances," drawn for the larger part from the physical sciences. Some of his instances are correct, some are fantastic. Only two of them, the eleventh and the sixteenth, are at all closely connected with the subject of his economic writings, and these instances are reprinted as apposite illustrations of an idea which was not without influence upon his work in political arithmetic. The eleventh instance is found at pages 82—88, the sixteenth at pages 106—109 of the "Discourse," as printed in 1674. See Bibliography. Cf. also Birch, iii. 156, Fitzmaurice, 268. Bishop Barlow's *Remains* contain a sharp criticism of the "Discourse."

² Cf. Graunt's "Observations," p. 387.

Age. Now whether these be sufficient reasons, is not the present Enquiry; but taking the afore-mentioned Assertion to be true: I say, that the Roots of every number of Mens Ages under 16 (whose Root is 4) compared with the said number 4, doth shew the proportion of the likelihood of such mens reaching 70 years of Age. As for example; 'Tis 4 times more likely, that one of 16 years old should live to 70, then a new-born Babe. 'Tis three times more likely, that one of 9 years old should attain the age of 70, than the said Infant. Moreover, 'tis twice as likely, that one of 16 should reach that Age, as that one of 4 years old should do it; and one third more likely, than for one of nine. On the other hand, 'tis 5 to 4, that one of 26 years old will die before one of 16; and 6 to 5 that one of 36 will die before one of 26; and 3 to 2, that the same person of 36 shall die before him of 16: And so forward according to the Roots of any other year of the declining Age compared with a number between 4 and 5, which is the root of 21, the most hopeful year for Longævity, as the mean between 16 and 26; and is the year of perfection, according to *Our Law*, and the Age for whose life a *Lease* is most valuable. To prove all which I can produce the accompts of every Man, Woman, and Child, within a certain Parish of above 330 Souls; all which particular Ages being cast up, and added together, and the Sum divided by the whole number of Souls, made the Quotient between 15 and 16; which I call (if it be Constant or Uniform) the Age of that Parish, or *Numerus Index* of Longævity there. Many of which Indexes for several times and places, would make a useful Scale of Salubrity for those places, and a better Judg of Ayers than the conjectural Notions we commonly read and talk of. And such a Scale the *King* might as easily make for all his Dominions, as I did for this one Parish.

The Sixteenth Instance.

In the Price of several Commodities.

Suppose a *Mast* for a small Ship be of 10 inches Diameter, and as is usual, of 70 foot in heighth, and be worth 40s; then a Mast of 20 inches through, and double length also, shall not

only cost eight times as much, according to the Octuple quantity of Timber it contains, but shall cost 16 times 32*l.* And by the same Rule, a Mast of 40 inches through shall cost 16 times 32*l.* or 516*l.* Of which last Case there have been some instances. But whereas it may be objected, That there are no Masts of four times 70, or 280 feet long, I will say, that the Rule holds in common practice and Dealing. For, if a Mast of 10 inches thick, and 60 foot long, be worth 30*s*; a Mast of 20 inches throughout, and 80 foot long, shall be worth 15*l.* And a Mast of 40 inches through, and 100 foot long (not 280 foot) shall be worth near 100*l.*

Moreover, suppose *Diamonds* or *Pearls* be equal and like in their Figures, Waters, Colours, and Evenness, and differ only in their Weights and Magnitudes; I say the Weights are but the Roots of their Prices, as in the Case aforesaid. So a Diamond of Decuple weight, is of Centuple value. The same may be said of Looking-glass-Plates. I might add, that the Loadstone A, if it take up 10 times more than the Loadstone B, may be also of Centuple value.

Lastly, A Tun of extreme large *Timber* may be worth two Tuns of ordinary dimensions; which is the cause of the dearness of great shipping above small; for the Hull of a Vessel of 40 Tuns may be worth but 3*l.*, *per* Tun, whereas the Hull of a Vessel of 1000 Tuns may be worth near 15*l.*, *per* Tun. From whence arises a Rule, how by any Ships Burthen to know her worth by the Tun, with the Number and Size of her Ordinance, &c.

II.

[The Dialogue of Diamonds¹.]

A. You have a fine ring there on your finger, what did it cost you?

B. I am ashamed to tell you for I am afraid I gave too

¹ The "Dialogue of Diamonds" is found among the Philosophical Papers collected by Abraham Hill. Brit. Mus. Sloane MS. 2903, f. 44 seq. Dr Hill (1635—1721) was resident in Gresham College in 1660 and was one of the

much for it, & the truth is I wonder how any man [can] tell what to give, there be so many nice considerations in that matter in all which one has nothing but meere guesse to guide himself by.

A. Why, did you buy it set?

B. What should I doe with it unset?

A. If you bought it set you lost two of the best guides & measures whereby to have known its price, namely the weight and the extent, both which are computable otherwise then by meer guesse; beside the water and colour of the stone as also the clouds icecles & points are somewhat better discerned when you can look round about it, then when you look upon it but as through a window.

B. Well, I was not so wise; but I must needs buy some more diamonds shortly, wherefore pray instruct me if you can.

A. I will & first take notice that the deerness or cheapness of diamonds depends upon two causes, one intrinsec which lyes within the stone it self & the other extrinsec & contingent, such as are [I.] prohibitions to seek for them in the countrys from whence they come. 2. When merchants can lay out their money in India to more profit upon other commoditys & therefore doe not bring them. 3. When they are bought up on feare of warr to be a subsistence for exiled and obnoxious persons. 4. They are deer neer the marriage of some great prince, where great numbers of persons are to put themselves into splendid appearances, for any of these causes if they be very strong upon any part of the world they operate upon the whole, for if the price of diamonds should considerably rise in Persia, it shal also rise perceivably in England, for the great merchants of Jewels all the world over doe know one another, doe correspond & are partners in most of the considerable pieces & doe use great confederacys & intrigues in the buying & selling them.

twenty-one persons, Petty being another, who were named members of the Council in the second charter of the Royal Society, 1663. Birch, I. 223. The "Dialogue," apparently in Hill's hand, is without title or caption, but it is ascribed by him to Petty and both its method of reasoning and its style of expression confirm the correctness of his ascription. I have followed the suggestion of Dr Bevan in calling the paper "The Dialogue of Diamonds." Bevan, *Petty*, p. 63.

B. I like this discourse very well but have no occasion for so deep an inspection into the matter. I have but 2 or 300*l.*, to lay out and I heare that the market at this time is at a midling pitch & therefore I had rather heare from you upon the intrinsec causes & such as lye within the stone it self.

A. I am content. You must therefore know that these intrinsec causes are principaly foure, vizt. weight, extent, colour or water, cleanness from faults, & to these you may adde the mode and workmanship of the cutting.

B. When I bought my ring I did not divide my consideration into so many branches: methought it made a fine shew in general & I bid 85, 86 & 87*l.*, for it, & the merchant swore he could not afford it so & seemed to goe away once or twice and thereupon I gave him 90*l.*, & he told me that he would give me 85*l.*, for it at any time within a twelvemoneth & defys me to match it anywhere for the money I gave him. Besides I had shewed it to 2 or 3 friends, who all, to shew their skill, made some special animadversions upon the business & told me I could not be much out if I gave between 80 & 90*l.*, for it; and this is all the art I had. I expect now to be wiser from you.

A. I told you there must be four intrinsick causes of dearness & cheapness, vizt. Weight, Extent, Colour & Clearness. As for the weight you must get you a pair of Scales that will weigh with certainty to less then a quarter of a grain. As for extent you must get a piece of Muscovia glasse or very fine horne, wherein must be a square drawn of an inch in the side & the said Square divided into 400 Squares, dividing each side into 20 parts by the finest lines that can be drawn, making every fourth division in a line something bigger then the rest for distinction sake. Thirdly you must have 5 or 6 diamonds to lye constantly by you, each of a severall water, & you must have in the opinion of the best jewellers the proportion of value which the said waters do beare one to another, as for Ex.: Suppose a stone weigh a graine & being of the best water is worth 25^s, of the black water 20^s, of the red 16^s, of the yellow 14^s, of the blewish 13^s, of the brownish 12^s &c. Fourthly you must have

as many foule diamonds as doe contain Samples of every sort of fault & a note of such abatements as an experienced Jeweller would make for every such fault, the same to be expressed in aliquot parts of the whole value, & you must also have a pair of excellent Spectacles for the older sight with a good microscope, & then I conceive you are furnisht with the means of knowing more than most jewelers doe know.

B. I cannot remember all you have said : therefore repeat the same over again in parts, & first concerning the weight.

A. I shal. The general rule concerning weight is this that the price rises in duplicate proportion of the weight, that is to say as the Squares of the weight are one to another or the weight multiplyd by it self. As for Ex.: Suppose a diamond weighing one grain to be worth 20^s then a diamond of 2 grains is worth 4*l.*, because the square of two is 4, that is, 2 multiplyd by 2 makes 4 ; & the diamond of 2 greins is to be paid for as if it weighed 4 & by the same rule a diamond of 3 grains must be reckoned as if [it] weighed 9, because 3 times 3 makes 9, & a diamond of 4 grains is to be reckond as 16, & according to this rule the great Moguls diamond of 1000 grains is reckoned worth a million of pounds Sterling and the Duke of Florences 20000*l.* Now judge you whether it be safe buying a diamond of 20 grains by the eye without weighing, in which a graine difference in the weight makes about 43*l.*, difference in the price, reckoning the single grain but for 20*s.*

B. I have one notable & obvious objection against your rule, which is that Lapidarys do use to divide a stone into 2 parts, making according to your rule each half to be but a quarter of the value of the whole & the two halves after the charge and hazard of dividing to be worth but half what the whole was worth before dividing—answer me that.

A. I doe acknowledge that the rule of weight alone is insufficient, as you have judiciously observed. Wherefore you must come to the next measure which is extent ; and extent is chiefly measured by the magnitude of the superficies which the great section of the stone doth make, and by cutting the stone into two parts, if the stone were valued only by the said superficies, the value of the stone cut is doubled, whereas

according to the weight it was halved. But this would better appear in an example. Suppose a stone intire to be worth 8*l*. Now if the same be cut in two halves, each half reckoned by the weight alone would be reduced to 40*s*. and the two halves to 4*l*. But if the stone be reckoned according to the extent and superficies only, then the two halves would be worth two eight pounds or 16*l*. But forasmuch as the rule of weight alone and the rule of extent alone are each of them insufficient, you must joyne them both together and take the medium. For joining 4*l*.: the value by weight, to 16*l*., the value by measure, the total is 20*l*., the half whereof is 10*l*.; and thus you see the stone which intire is worth but 8*l*., being divided is worth 10*l*., yielding an advantage of 40*s*., which is more than the charge of dividing it doth commonly amount to.

B. Your answer is very satisfactory & ingenious & from whence I now understand the use of your glass or horne table. For I suppose that by applying the flat section to the squared table you may with diligence measure the difference of any superficies almost exactly.

A. You apprehend it right & when I have measured so the extent of two several stones, I cast up their values by the aforementioned rule of duplicate proportion, & having cast them up both by weight & by measure, I take the medium.

B. Lord bless me, what a fool was I wholly to omit those two guides neither of which could I make use of whilst the stone was set, & how easy is it for the best jeweler in the world to mistake one grain or one square in 20, nay, to mistake one in 100 where the value of one grain is above 200*l*., and how doe the workmen who doe set diamonds indeavour so to set them as to make them look 5 grains or 5 squares in 100 bigger then they are. I am very well pleased with this discourse by which in a quarter of an houre one may learn to get or save 2 or 300*l*., & to learn an art which is so little the worse for the wearing.

A. I am glad you accept my advice. Some men would have made a frivolous objection against it, or have received it with a scornfull smile as a prety useless fancy and no more. But because you are so candid, I will proceed to the other points.

B. I heartily thanke you.

A. You must make such a measure upon your glass table as may correspond to the value of your grain, and when you have by the weight found how many grains you are to pay for, and by your note of colours at how much per grain, & when you have again by your table of magnitudes found how many squares you are to pay for at the same rate at which you reckoned the graine, then adding the value by weight to the value by extent, the half of that summ is the value of that stone according to its weight, extent & colour.

B. I apprehend. And I thinke there remains nothing more then to teach me how to make my abatements of the value so found as aforesaid according to the several natures & numbers of the defects.

A. Well, this I will doe. You must remember you were to keep by you such and so many stones as doe contain all the usual faults of diamonds with the quota parts of the value which for each defect is to be abated. As for example, suppose there be a black speck in a stone which without it were worth 10*l.* according to our former rules, but with it is worth 4*s.* lesse. Now you must remember that this 4*s.* must be lookd upon as the 50th part of the value, and therefore you must abate 10*l.* in a stone of 500*l.* tho you abated but 4*s.* in a stone of 10*l.* Moreover suppose there be not only the black speck abovementioned but an icecle also in your stone of 10*l.* for which you are to abate 10*s.* and consequently the icecle & the speck 14*s.* Now I conceive that, because there are two faults, you must not only abate 10*s.* & 4*s.* but the double of the same, namely 28*s.* Again suppose that beside the speck and the icecle there be also a cloud, for which alone you might abate 6*s.* more, that is 4*s.*, 10*s.* & 6*s.*, in all 20*s.* I say that in this case you must not only abate barely 20*s.* nor the double thereof as when there were but two faults, but because there are three faults, you must abate the treble of all three, which is 3*l.*, leaving your stone of 10*l.* reduced to 7*l.* Now this triple abatement in a stone of 500*l.* would be 150*l.*, because that 150*l.* is $\frac{3}{10}$ of 500*l.*, as the 3*l.* was $\frac{3}{10}$ of 10*l.*

B. I thinke I understand this doctrine, but there comes a conceit in my head which makes me laugh, for how if all the faults thus cast up together should amount to more then the value, will you say that the stone in such a case is so much worse then nothing? Certainly its worth something to make diamond powder of, were it never so foul or mishapen.

A. Your objection is good. Tis a pleasure to teach you, and to what you have said I can only answer these two things: that I have heard able jewelers say that the difference of stones of equal weight is seldome more then between 15 & 5 or 3 & 9, namely that the best with all its perfections is but triple to the worst with all its faults. The other thing I say is that in case your defects cast up as aforesaid should bring your stone below $\frac{2}{3}$ of its full value resulting from the weight, extent & colour, I say in such a case that the estimate of your defects must be reviewed, tempered & better proportioned & adjusted.

III.

THE POWERS OF THE KING OF ENGLAND¹.

10. Dec^r. 1685^a by S^r. W. Petty.

1. The King has a Prerogative which Lawyers must expound.

¹ The "Powers of the King of England" are printed from a MS. volume bearing the title "Adversaria Literaria I. P.," Brit. Mus. Addl. MSS. 27,989, f. 17—18. The volume contains a book-plate of Sir John Perceval, of county Cork, Ireland, dated 1702. Cf. Hamilton, *Dated Book-plates*, 28. Perceval was born in 1683. The death of his father, Sir John Perceval, a friend of Petty's (Fitzmaurice, 270), in 1686, left him an orphan and ward of Sir Robert Southwell. He was created Baron Perceval in 1715, and Earl of Egmont in the peerage of Ireland in 1733, and died in 1748. Perceval, who was in a position to procure copies of Petty's writings, was a diligent collector of MSS. Other volumes of "Adversaria" apparently compiled by him, are in existence, one of them containing a "character" of Petty. *7th Rept. Hist. MSS. Com.* pp. xiii. 232—249. The "Powers of the King" are in the same hand, probably Perceval's, as the remaining, very miscellaneous, contents of the British Museum's volume of the "Adversaria." Another MS. of the "Powers of the King" is the property of the Marquis of Bath, at Longleat. *3rd Rept. Hist. MSS. Com.* 199.

² The 17th November, James had replied to the address of the Commons on the

2. The King makes Peers in Parliament who are perpetuall Legislators, as also the Last and highest Judicature of England and Ireland, and have great Priviledges and Immunitys for themselves and Servants.

3. The King is the fountain of Honour Titles & Precedencys and of all the Powers which the Lrd Marshall & Heralds exercise.

4. The King makes Bishops; and They Priests & Deacons, & Clerks of the Convocation, and has also all the Power which the Pope had formerly. Bpps make Chancellors and other officers of the Spirituall Courts have power to Excommunicate &c.

5. The King makes the Chancellors of the Universitys, makes Heads and Fellows in Severall Colledges, and is also Visitor in some Cases.

6. The King has the Power of Coynage, & can give the Name, Matter, fineness, Character and Shape to all Species of Money and can cry Money up and downe by his Proclamation; Which some extend to this vizt That if A. Lend B. 100*l*. weighing 29 pounds of Sterling Silver, If the King by his Proclamation declare that one Ounce of Silver shall be afterward calld One hundred pounds, that then B. paying to A. the said Ounce of Silver, the Debt is answer'd.

7. The King makes Sheriffs and they Juries upon Life and Estate, Limb and Liberty, as also Jaylors Baylifs & Executioners of All Sorts.

8. The King makes a Chancellor or Cheif Judge in Equity who Stopps proceedings in other Courts of Law &c. The Chancellor makes Justices of Peace, & they High & petty Constable, & Sessions of Peace, &c.

9. The King makes Judges durante bene placito. They

test. On the 19th there ensued the notable debate in the House of Lords in which not only Halifax, but Compton, Mordaunt, and Devonshire criticised the King's policy with vigour. The following day Parliament was prorogued. Under such circumstances it is not surprising that so active-minded a man as Petty should have set down his ideas as to the extent of the prerogative. His expectations of reform, based upon the exercise of the royal power, though mistaken, seem to have been sincere, and it is to them that we owe, in part at least, several of his later writings.

sett fines and punish at their own Discretion in Severall Cases. They Govern Proceedings at Law, Declare and Interpret the Law, Repeive, &c. & the King can suspend the Law, pardon, or prosecute.

10. The King can give Charters for Boroughs to Parliament, appoint Electors and Judges of Elections, prorogue adjourn and dissolve Parliaments from time to time, and from Place to Place, disprove the Speaker &c.

[11.] The King appoints his Lieutenants to command the Grand Standing Militia, can press any Man to serve his Allies beyond Seas, as Soldiers, can equip & appoint what number of Shippes and Seamen he pleases & their Wages & pari Ratione a Mercenary Army to serve at Land, as also Guards for his Person of Severall Sorts.

12. The King has some Revenue by Common Law and Prerogative & can by his Judges interpret Statutes concerning the Branches and the Collection thereof.

13. The King has great power over Forests and Mines, Colonys Monopolys.

14. The King can doe noe Wrong, & his coming to the Crown clears him from all punishments &c. due before, and obedience to him after Coronation excuses from¹

15. The King by ceasing or forbearing to administer the Severall Powers above nam'd can doe what harm he pleases to his Subjects.

¹ Unfinished in the MS.

BIBLIOGRAPHY OF THE PRINTED WRITINGS
OF SIR WILLIAM PETTY¹.

[1.] A | declaration | Concerning the newly invented | Art of |
double writing. | Wherein are expressed the reasons of the | Authors
proceedings in procuring a Priviledge for | the same : As also of the
Time, Manner, and | Price, of the discovery of the said | Art, and
of the Instruments | belonging thereunto. | For the satisfaction of
all that desire to | be partakers of the great benefit of the same, |
before they adventure anything towards | the reward thereof. |
Whereunto is annexed a copie of an Ordi-nance of both Houses of
Parliament, approving the | feasibility and great use of the said
invention, and allow-|ing a Priviledge to the Inventor, for the sole
benefit there-|of for 14 years, upon the penalty of one hundred
pounds. | [Ornament.]

London, | Printed by R. L. for R. W. at the Star under Saint
Peters Church in Cornhill, 1648.

Title, 1 l. pp. 1—10, 4°.

[2.] [Begin.] THere is invented an Instrument of small bulk
and price...[end] Saint Peters Church in Cornhill.

Broadside, folio, no date. It mentions the *Declaration* as already printed and
requests contributors to pay their money to the inventor at ——. In the British
Museum copy the blank is filled in with a pen, "his lodging next doore to the
White Boare in Lothbury."

[3 a.] The | advice | of | W. P. | to | Mr. Samuel Hartlib. |
For | The Advancement of some particu-|lar Parts of Learning. |
[Ornament.]

London, Printed Anno Dom. 1648.

Title, 1 l., advertisement, 1 l., epistle dedicatory 1 l., pp. 1—26, 4°. —
The epistle is dated: London the 8 January. 1647.

¹ A trial *Bibliography of Sir William Petty*, containing brief entries of nearly
all the titles here printed, was contributed by me to *Notes and Queries* of 31 August
and 14 September, 1895, 8th series, viii. 163—165, 202—203.

[3 b.] *Same, in* The Harleian Miscellany... Vol. vi.

London: Printed for T. Osborne, in Gray's-Inn. MDCCXLV [1745]. 4°.—Pp. 1—13,

[3 c.] *Same, in* The Harleian miscellany... with... annotations, by the late William Oldys,... and... Thomas Park... Vol. vi.

London: printed for White and Co., and John Murray, Fleet Street; and John Harding, St. James's Street. 1810. 4°.—Pp. 1—14.

[3 d.] *Same, in* The Harleian miscellany...with historical, political, and critical notes. Vol. vi.

London: printed for Robert Dutton, Gracechurch-Street. 1810. 8°.—Pp. 141—158.

[4] A | brief | of | proceedings | between | S^r. Hierom Sankey | and | D^r. William Petty. | With | The State of the Controversie | between them | Tendered to all Indifferent Persons. | [Ornament.]

London. | Printed in the Year, M.DC.L.IX. [1659].

Title, 1 l., to the reader, 1 l., pp. 1—8, f.

[5 a.] Reflections | upon some | Persons and Things | in | Ireland, | by | Letters to and from D^r Petty: | with | Sir Hierome Sankey's Speech | in | Parliament.

London, | Printed for John Martin, James Allestreya, and | Thomas Dicas, and are to be sold at the | Bell in St. Paul's-Church-Yard. 1660.

Title, 1 l., pp. 1—142, 147—162, 159—185, contents, 6 ll., 8°. — The pages of signature K, which should be 143—158, are all numbered four too high.

[5 b.] Reflections | upon some | persons and things | in | Ireland, | by | letters to and from | Dr. Petty: | with | Sir Hierom Sankey's speech | in | parliament.

Dublin: | printed by Zachariah Jackson, | For Grueber, and M'Allister, No. 59, Dame-Street. | 1790.

Pp. [i]—xxiv. 1—187, 8°.

[6 a.] A | treatise | of | Taxes & Contributions. | Shewing the Nature and Measures of | Crown-Lands. | Assesments. | Customs. | Poll-Moneys. | Lotteries. | Benevolence. | Penalties. | Monopolies. | Offices. | Tythes. | Raising of Coins. | Harth-Money. | Excize, &c. | With several intersperst Discourses and Digressions concerning | Warres. The Church. | Universities. | Rents & Purchases. | Usury & Exchange. | Banks & Lombards. |

Registries for Con-veyances. | Beggars. | Ensurance. | Exporta-
 tion of {Money. | Free-Ports. | Coins. | Housing. | Liberty of
 {Wool.
 Con-science, &c. | The same being frequently applied to the pre-
 sent State and Affairs of | Ireland.

London, Printed for N. Brooke, at the Angel in Cornhill. 1662.

Title, 1 l., preface 3 ll., index 4 ll., pp. 1—75, errata, 1 l. 4°.

[6 b.] A | treatise | of | Taxes & Contributions. | Shewing the
 Nature and Measures of | Crown-Lands, | Assesments, | Customs, |
 Poll-Moneys, | Lotteries, | Benevolence, | Penalties, | Monopolies, |
 Offices, | Tythes, | Raising of Coins, | Harth-Money, | Excize, &c. |
 With several intersperst Discourses and Digressions concerning |
 Warrs, | The Church, | Universities, | Rents and Purchases, | Usury
 and Exchange, | Banks and Lombards, | Registries for Con-veyances, |
 Beggars, | Ensurance, | Exportation of {Money, | Free-Ports, | Coins, |
 {Wool,
 Housing, | Liberty of Consci-ence, &c. | The same being fre-
 quently applied to the present | State and Affairs of Ireland.

London. Printed for Nath. Brooke, at the Angel for-merly in
 Cornhill, now in Gresham-College, going into the | Exchange from
 Bishopgatestreet. 1667.

Title, 1 l., preface, 3 ll., index, 4 ll., pp. 1—72, 4°.

[6 c.] A | treatise | of | Taxes and Contributions. | Shewing the
 Nature and Measures of | Crown-Lands, | Assesments, | Customs, |
 Poll-Moneys, | Lotteries, | Benevolence, | Penalties, | Monopolies, |
 Offices, | Tythes, | Raising of Coins, | Harth-Money, | Excise, &c. |
 With several intersperst Discourses and Digressions concerning |
 Warrs, | The Church, | Universities, | Rents and Purchases, | Usury
 and Exchange, | Banks and Lombards, | Registries for Con-veyances. |
 Beggars, | Ensurance, Exportation of {Money, | Free Ports, | Coins, |
 {Wool,
 Housing, | Liberty of Consci-ence, &c. | The same being frequently
 applied to the State and Affairs of | Ireland, and is now thought
 seasonable for the present Af-fairs of England.

London, Printed for Obadiah Blagrove, at the Sign of | the Bear
 in St. Paul's Church-Yard, over against | the Little North-Door
 1679.

Title, 1 l., preface, 3 ll., index, 4 ll., pp. 1—72, 4°.

[6 d.] A | treatise | of | Taxes and Contributions. | Shewing the Nature and Measures of | Crown-Lands | Assessments, | Customs, | Poll-Moneys, | Lotteries, | Benevolence, | Penalties, | Monopolies, | Offices, | Tythes, | Raising of Coins, | Harth-Money, | Excise, &c. | With several intersperst Discourses and Digressions concerning | Wars | The Church, | Universities, | Rents and Purchases, | Usury and Exchange, | Banks and Lombards, | Registers for Conveyances. | Beggars, | Ensurance, | Exportation of { Money, | Free Ports, | Coins, | Wool, | Housing, | Liberty of Conscience, &c. | The same being frequently applied to the State and Affairs of | Ireland, and is now thought seasonable for the present Affairs of England. | The Third [*sic*] Edition.

London, Printed for Obadiah Blagrove, at the Sign of the Bear | in St. Paul's Church-Yard, over against the Little North Door. 1685.

Title, in a double-lined border, 1 l., preface, 3 ll., index, 4 ll., pp. 1—72, 4°. — Apparently a reissue of the edition of 1679, with a new title page. Copies of this ed. are also bound in the following :

[6 e.] A | collection | Of three | state tracts : | I. The Privileges and Practice of Parliaments, &c. | II. The Politician discovered, or Considerations of the | Late Pretensions of France to England and Ireland ; | and their Plots in order thereunto. | III. A Treatise of Taxes and Contributions, shewing | the Natures and Measures thereof, particularly | fitted for the State of Ireland. | Written, | By Sir William Petty of Ireland.

London, | Sold by O. Blagrove at the Bear and Star | in St. Paul's Church-yard. 1690.

This book consists of copies of : 1st, Privileges and practice of parliaments in England : collected out of the common Law of this land. London: Robert Harford, 1680 [first printed in 1628]; 2 ll., pp. 1—44; 2nd, The politician discovered, or considerations [etc]. By a true protestant and well-wisher of his country. London: Langley Curtis, 1681; 1 l., pp. 1—28, 1—23; 3rd, the "third" ed. of Petty's Treatise. London: Obadiah Blagrove, 1685 (see no. 6 d above). Each of these tracts has its separate title-page, pagination, and signatures; they are simply bound together, preceded by a copper plate representing the two houses of Parliament in session, and a title-page as above.

[6 f.] A | discourse | of | taxes and contributions : | Shewing the Nature and Measures of | Crown-Lands, | Assesments, | Customs, | Poll-Moneys, | Lotteries, | Benevolence, | Penalties, | Monopolies, |

Offices, | Tythes, | Hearth, | Excise, &c. | With several intersperst
Discourses and Digressions concerning | Wars, | The Church, |
Universities | Rents and Purchases, | Usury and Exchange, | Banks
and Lombards, | Registries for Con-veyances, | Beggars, | Ensur-
ance, | Exportation of { Money, | Free Ports, | Coins, | Housing. |
 { Wooll,
Liberty of Consci-ence, &c. | The same being frequently applied to
the State and Affairs | of Ireland, and is now thought seasonable for
the pre-sent Affairs of England; humbly recommended to the |
present parliament.

London, | Printed for Edward Poole, at the Ship, over against
the | Royal Exchange in Cornhill, 1689.

Title, 1 l., preface, 3 ll., index, 4 ll., pp. 1—72, 4°. — A reissue of the
1679 edition (6 c) with a new title-page.

[6 g.] See 27.

[7 a.] An apparatus to the history of the common practices of
Dying. By Sir William Petty. *In* The | history | of the | Royal-
Society | of | London, | For the Improving of | Natural Knowledge. |
By | Tho. Sprat.

London, | Printed by T. R. for J. Martyn at the Bell without |
Temple-bar, and J. Allestry at the Rose and Crown in | Duck-
lane, Printers to the Royal Society. | M DC LXVII [1667]. 4°.—
Pp. 284—306.

[7 b.] *Same, in* The history of the Royal-Society... The Second
Edition Corrected.

London: Printed for Rob. Scot, Ri. Chiswell, Tho. Chapman,
and Geo. Sawbridge. And are to be sold by Them, and by Tho.
Bennet. 1702. 4°.—Pp. 284—306.

[7 c.] *Same, in* The history of the Royal Society... The Third
Edition Corrected. [Ornament.]

London: Printed for Samuel Chapman at the Angel and Crown
in Pallmall. MDCCXXII [1722]. 4°.—Pp. 284—306.

[7 d.] *Same, in* The history of the Royal Society... The Fourth
Edition. [Ornament.]

London: Printed for J. Knapton, J. Walthoe, D. Midwinter,
J. Tonson, A. Bettesworth and C. Hitch, R. Robinson, F. Clay,
B. Motte, A. Ward, D. Brown, and T. Longman. M DCC XXXIV
[1734]. 4°.—Pp. 284—306.

[7 e.] L'Histoire de la Pratique ordinaire de la Teinture par le Chevalier Gvillavme Petty. *In* L'histoire | de la | Societé [*sic*] | Royale | de | Londres, | Establie pour l'Enrichissement de la | science natvrelle | Escrite en Anglois par | Thomas Sprat, | Et traduite en Francois. | [Woodcut.]

A Geneve, | Pour Iean Herman Widerhold. | M. DC. LXIX [1669]. 8°.—Pp. 346—374.

[8.] The | discourse | Made before the | Royal Society | The 26. of November 1674. | Concerning the Use of | Duplicate Proportion | In sundry Important Particulars: | Together with a | New Hypothesis of Springing | or Elastique Motions. | By Sir William Petty, Kt. | Fellow of the said Society. | Pondere, Mensurâ, & Numero Deus omnia fecit: | Mensuram & Pondus Numeres, Numero omnia | fecit.

London: | Printed for John Martyn, Printer to the | Royal Society, at the Bell in | St. Paul's Churchyard, 1674.

1 l., recto blank, verso order of Royal Society to print, title, 1 l., epistles dedicatory, 13 ll., errata, 1 l., pp. 1—135, 12°. — The order of the Royal Society to print is dated 10 December, 1674, the epistle to Lord Brouncker is dated "ult. Decemb."

[9.] Colloquim | Davidis | cum anima sua, (Accinente Paraphrasim in 104 Psalmum) | De Magnalibus dei. | 25^o Martii 1678. fecit | Cassid. Avreus Minvtivs. | Imprimatur, | Guil. Jane. | August 31. 1678. | [Ornament.]

Londini, | Impensis Thomæ Burrell, Bibliopolæ, ad Insigne Pilæ auratæ, sub | Templo S^{cti} Dunstani in Vico vulgò vocato Fleet-street. | M DC LXX IX [1679].

Title, 1 l., pp. 1—6. f°. — The occasion of this translation is described on p. xxviii of the Introduction.

[10 a.] Sir William Petty's | Quantulumcunque concerning Money, 1682. | To the Lord Marquess of Halyfax.

[At end:] London, Printed in the Year 1695.

No title-page, pp. 1—8, 4°. — The above caption stands at the top of page 1, which is also signature A. None of the five copies that I have seen shows any trace of a former title-page. Three have and two have not "Price 2d." at the end of the text. Cf. p. 448. There was, apparently, another edition in 1695, printed for A. and J. Churchill (see McCulloch's reprint below, no. 10 e) but I have not been able to find a copy of it.

"A Complete Catalogue of all Books lately Printed concerning the Coin," which is appended to Proposals for a National Bank, setting forth how Three Millions of Pounds may be raised... (London, Printed for Richard Cumberland, at the Angel

in S. Paul's Church-Yard, 1697), mentions, as no. 22 on p. 46, "Sir William Petty's *Quantulumcunque concerning Money*, 1612. 2 sheets in 8vo." McCulloch's *Literature of Political Economy*, p. 155, cites "*Quantulumcunque; or a Tract concerning Money*, addressed to the Marquis of Halifax, by Sir William Petty. 4°. (London) 1682." I have found no copy of an edition of 1682, either in octavo or in quarto.

[10 b.] Observations | relating to the | coin | of | Great Britain ; | consisting | Partly of Extracts from Mr Locke's Treatise concerning Money, but chiefly | of such Additions thereto, as are thought to be very necessary at this | Juncture : not only for remedying the present great Scarcity of Silver, | but for putting a stop to those Losses which this Nation suffers by the | over-valuing of Gold-Money, and by prohibiting both the Melting and | Exporting of British Coin : | Whereunto is annexed, | Sir William Petty's | *Quantulumcunque* | concerning | money ; | Reprinted from an Edition that was printed for private Use in the Year 1695 ; | and corrected by a Manuscript Copy of very good authority. By J. Massie.

London : | Printed for T. Payne, in Castle-Street, Charing Cross ; | Sold by | W. Owen at Temple-Bar, and | C. Henderson, under the Royal Exchange. | MDCCLX [1760]. | (Price One Shilling.)

On p. 32 begins Sir William Petty his *Quantulumcunque concerning Money*, "reprinted from an Edition that was printed for private Use in the Year 1695, and corrected by a Manuscript Copy of very good Authority." Cf. p. 438.

[10 c.] *Same, in* A collection of scarce and valuable tracts, on the most Interesting and Entertaining Subjects :... Selected from... Public, as well as Private Libraries ; Particularly that of the late Lord Somers. Revised by eminent hands. Vol. iv.

London : Printed for F. Cogan, at the Middle-Temple-Gate, in Fleet Street. M DCC XLVIII [1748]. 4°.—Pp. 73—79.

[10 d.] *Same, etc., in* A collection of scarce and valuable tracts... The second edition, revised, augmented, and arranged, by Walter Scott, Esq. Volume eighth.

London : Printed for T. Cadell and W. Davies, Strand... 1812. 4°.—Pp. 472—477.

[10 e.] Sir William Petty | his | *Quantulumcunque* | concerning | money. | To the Lord Marquess of Halyfax, | Anno 1682.

London : | Printed for A. and J. Churchill, at the | Black Swan, in Paternoster Row, 1695.

In A | select collection | of | scarce and valuable | tracts on money, | from the originals of | Vaughan, Cotton, Petty, Lowndes,

Newton, | Prior, Harris, and others. | With a preface, notes, and
 index. | [Quotation, 4 lines.]

London: | printed for the | Political Economy Club. | MDCCCLVI
 [1856]. 8°.—Pp. 157—167.

One hundred and twenty-five copies printed by the Political Economy Club of
 London for distribution among its members and their immediate friends. The
 tracts contained in the volume were taken from originals supplied by J. R.
 McCulloch, who also contributed the preface and notes.

[11.] The | fourth part | of the | Present State | of | England. |
 Relating | To its Trade and Commerce within it self, and | with all
 Countries traded to by the English, as | it is found at this Day
 Established, giving a most | exact account of the Laws and Customs
 of Mer-|chants relating to Bills of Exchange, Policies of | Ensurance,
 Fraights, Bottomery, Wreck, Ave-|ridge, Contributions, Customs,
 Coyns, Weights, | Measures, and all other matters relating to Inland |
 and Marine affairs. | To which is likewise added Englands Guide
 to In-|dustry, or Improvement of Trade, for the good | of all People
 in General. | Written by a Person of Quality [i.e. Sir William
 Petty].

London, Printed by R. Holt for William Whitwood, | near the
 George Inn in Little Britain, 1683.

Title, 1 l., To the Reader, signed: J. S., 1 l., contents, 4 ll., pp. 1—362,
 followed by:

England's | guide | to | industry: | or, | Improvement of Trade, | for the good
 of all Peo- | ple in general. | London, | Printed by R. Holt for T. Passinger
 at | the three Bibles on London-Bridge, and | B. Took at the Ship in St Pauls-
 Church- | Yard. 1683.

Title, 1 l., preface, 5 ll., pp. 1—102, 12°. — Page 1 of England's Guide
 has this caption: "A Discourse of Trade. Being a Comparison between England
 and other parts of Europe, wherein the Incouragement of Industry is promoted
 in these Islands of Great Britain and Ireland." England's Guide to Industry is a
 surreptitious issue of Petty's Political Arithmetick. Cf. p. 238 and pp. 122—123 of
 this book. In fact the whole Fourth Part of the Present State of England is
 fraudulent, cf. Wood, *Athenæ Oxon.*, ed. Bliss, iv. 793.

[12 a.] Observations | upon the | Dublin-Bills | of | mortality, |
 MDCLXXXI. | and the | State of that city. | By the Observator
 on the London | Bills of mortality. | [Ornament.]

London: | Printed for Mark Pardoe, at the Sign of | the Black
 Raven, over against Bedford-|house in the Strand. 1683.

Title, 1 l., pp. 1—8, postscript to the stationer, 2 ll., and 3 folding tables not
 included in the pagination, 8°.

[12 b—h.] See 20 a, 26 a—e and 27.

[13 a.] Another | essay | in | Political Arithmetick, | Concerning the Growth of the | city | of London: | with the | Measures, Periods, Causes, | and Consequences there-|of 1682. | By Sir William Petty, Fellow of the | Royal Society.

London: Printed by H. H. for Mark Pardoe, at the Black | Raven, over against Bedford-House, in the Strand. 1683.

Pp. 1—47, 8°. On p. 47, after “finis,” is this advertisement: “Observations upon the Dublin Bills of Mortality M.DC.I XXXI. And the state of that City. By the Observator on the London Bills of Mortality. In Octavo.” See p. xlii of the Introduction.

[13 b.] *Same, in A* | collection | of the | yearly bills | of | mortality, | From 1657 to 1758 inclusive. | Together with several other Bills of an earlier Date. | To which are subjoined | I. Natural and Political Observations on the bills of mortality: by Capt. | John Graunt, F.R.S. reprinted from the sixth [*sic*] edition, 1676. | II. Another essay in political arithmetic, concerning the growth of the | city of London; with the measures, periods, causes, and consequences | thereof. By Sir William Petty, Kt. F.R.S. reprinted from the edi-tion printed at London in 1683. | III. Observations on the past growth and present state of the city of Lon-don; reprinted from the edition printed at London in 1751; with | a continuation of the tables to the end of the year 1757. By Corbyn | Morris, Esq; F.R.S. | IV. A comparative view of the diseases and ages, and a table of the pro-babilities of life, for the last thirty years. By J[ames] P[ostlethwayt] Esq; F.R.S.

London: | Printed for A. Millar in the Strand. | MDCCLIX [1759]. 4°.—Pp. 63—76. .

Dr Thomas Birch is commonly regarded as the editor of this Collection. Cf. Ogle's Inquiry into the Trustworthiness of the Old Bills of Mortality, in *Four. of the Stat. Soc.*, IV. 442; *Dict. of Natl. Biogr.*, s.v. Birch. But James Milne, writing about 1824, says, upon the authority of Dr William Heberden, the younger (1767—1845), that “the bills were collected into a volume by his father, the late Dr Heberden [1710—1801]. He procured likewise observations from several of his friends, rectors of some large parishes, or others likely to give him information; particularly from Bishop Mess, Bishop Squire, and Dr Birch. These, together with some of his own results, were thrown into the form of a preface; and the whole was committed to the care of Dr Birch. To make the calculations which appear at the end of the book, Dr Heberden employed James Postlethwayt, Esq., a very distinguished arithmetician.” *Suppl. to the 4th, 5th, and 6th Editions of the Encyclopædia Britannica*, II. 306.

[13 c—i.] See 17 a, 26 a—e, 27.

[14.] Experiments to be made relating to Land-Carriage, proposed by the learned Sr. William Petty Kt. *In Philosophical Transactions*, Vol. xiv., no. 161, pp. 666—667, 20 July, 1684.

[15 a.] Some Queries whereby to Examine Mineral Waters by the Learned Sir William Petty Knight. *In Philosophical Transactions*. Vol. xiv., no. 166, pp. 802—803, 20 December, 1684.

[15 b.] 32: Quæres for the Tryal of Mineral Waters; by the Honourable Sir William Petty, Knight. *In The Natural History of Wiltshire* by John Aubrey, R.S.S. edited by John Britton.

Published by the Wiltshire Topographical Society. London. MDCCCXLVII [1847]. 4°.—pp. 26.

[16.] A Miscellaneous Catalogue of Mean, vulgar, cheap and simple Experiments. Drawn up by Sr. William Petty, President of the Dublin Society, and by Him presented to that Society. *In Philosophical Transactions*. Vol. xv., no 167, pp. 849—853, 28 January, 1685.

Birch says that at the meeting of the Royal Society held 10 Dec., 1684, "upon mentioning sixty-three miscellaneous experiments proposed by Sir William Petty as desiderata, a paper containing them, which had latterly been printed at Dublin, was read, and being very well approved of, was ordered to be reprinted here." *Hist. of the Roy. Soc.*, IV. 346. I have not found a copy of the Dublin issue.

[17 a.] An | essay | Concerning the | Multiplication of Man-
kind: | Together with another | essay | in | Political Arithmetick, |
Concerning the Growth of the | City of London: | with the |
Measures, Periods, Causes, and Con-|sequencés thereof. 1682. |
The Second Edition Revised and Enlarged. | By Sir William
Petty, | Fellow of the Royal Society. | Licensed, Rob. Midgeley. |
Jan. 9. 1686.

London: Printed for Mark Pardoe, at the Black Raven | over
against Bedford-house in the Strand. 1686.

Title, 1 l., pp. 1—50, 8°. — On p. 50, after "finis," is this advertisement: "Observations on the Doublin Bills of Mortality MDCLXXXI., and the State of that City, by Sir William Petty, Fellow of the Royal Society. Sold by Mark Pardoe at the Black Raven in the Strand." See pp. xlii, liii of the Introduction.

[17 b—g.] See 26 a—e, 27.

[18 a.] Deux essays | d'arithmetique politique, | touchant | les
villes | de | Londres | et | Paris. | Dediés au roy, | Par le Chevalier
Petty, de la Société Royale.

A Londres, | Chés B.G., et se vendent par François Vaillant, |
Marchand Libraire demeurand dans le Strand, vis à vis | l'Église
Francoise de la Savoye. 1686.

Title, 1 l., dedication, 1 l., pp. 1—6, 4°. — This version of the Two
Essays, said to be a translation from the English edition licensed 26 August, 1686
(cf. p. 502), appears to have been published before the English original.

[18 b.] Two | essays | in | Political Arithmetick, | Concerning
the | People, Housing, Hospitals, &c | of | London and Paris. |
By Sir William Petty, | Fellow of the Royal Society. |—Qui sciret
Regibus uti | Fastidiret olus—

London, | Printed for J. Lloyd in the Middle Exchange | next
Salisbury-House in the Strand. 1687.

1 l., recto blank, verso imprimatur, title, 1 l., epistle dedicatory, 1 l., pp.
1—21, memorandum, 1 l., 8°.

[18 c—h.] See 26 a—e and 27. In the Philosophical Transactions for the
Years 1686 and 1687, Vol. xvi. no. 183, p. 152, July, August and September,
1686, there is An Extract of two Essays in Political Arithmetick concerning the
comparative Magnitudes, &c. of London and Paris by Sr William Petty, Knight,
R.R.S. This is printed on p. 513.

[19.] A further Assertion of the Propositions concerning the |
Magnitude, &c. of London, contained in two Essays | in Political
Arithmetick ; mentioned in Philos. Trans-act. Numb. 183 ; together
with a Vindication of the | said Essays from the ObjecTions of some
Learned Persons | of the French Nation, by Sr. W. Petty Knt. R.S.S.

Caption as above, followed by text, pp. 1—4, 4°. — Reprinted from
Philosophical Transactions of the Royal Society, Vol. xvi. no. 185, pp. 237—240,
Nov. & Dec., 1686. The reprint is repaged, but without title-page, & retains the
original signatures, Gg and Gg 2.

[20 a.] Further | observation | upon the | Dublin-Bills : | or, |
accompts | of the | Houses, Hearths, Baptisms, | And Burials in
that | city. The Second Edition, Corrected and Enlarg'd. | By
Sir William Petty, | Fellow of the Royal Society.

Lonon [*sic*] : | Printed for Mark Pardoe, at the Sign of | the
Black Raven, over-against Bed-|ford-House in the Strand. 1686.

Title, verso, the stationer to the reader, 1 l., pp. 1—6, followed by Observations
upon the Dublin-Bills of Mortality, 1681, as described above, no. 12 a, 8°.

[20 b—g.] See 26 a—e and 27.

[21 a.] Observations | upon the | cities | of | London | and Rome. | By Sir William Petty, | Fellow of the Royal Society.

London, | Printed for Henry Mortlocke, at the Phoenix, in | St. Paul's Church-Yard, and J. Lloyd, in the middle | Exchange next Salisbury-House in the Strand. 1687.

1 l., recto blank, verso imprimatur, title, 1 l., pp. 1—4, 8°.

[21 b—g.] See 26 a—e and 27.

[22 a.] Cinq essays | sur | L'Arithmetique Politique. | I. On Répond aux Objections tireés de | la Ville de Rey en Perse, & a celles de | Mr. Auzout contre les deux premiers Es-says, & l'on fait voir qu'il y a autant de | monde a Londres qu'a Paris, Rome & | Rouen pris ensemble. | II. Comparaison entre Londres & Paris en | 14 choses particuliers. | III. Preuves qu'il demeure dans les 134 pa-|roisses de Londres marquées dans les bil-|lets de mortalité, environ 696 mille per-|sonnes. | IV. Combien l'on estime qu'il y a de monde | a Londres, Paris, Amsterdam, Venise, | Rome, Dublin, Bristol, & Rouen avec | plusieurs remarques sur ce Sujet. | V. Touchant la Hollande & les autres VII | Provinces Unies. | Par le Chevalier Petty de la | Société Royale. | Invidiam Augendo ulciscar.

A Londres, | Impremie pour Henry Mortlock au Phœnix dore dans le Cimetier de St. Paul. 1687.

Five essays | in | Political Arithmetick, | viz. | I. Objections from the City of Rey in | Persia, and from Mons^r Auzout, against | two former Essays, answered, and that | London hath as many people as Paris, | Rome and Rouen put together. | II. A Comparison between London and | Paris in 14 particulars. | III. Proofs that at London, within its 134 | Parishes, named in the Bills of Morta-|lity, there live about 696 Thousand | People. | IV. An estimate of the People in London, | Paris, Amsterdam, Venice, Rome, Dublin, | Bristoll and Rouen, with several obser-|vations upon the same. | V. Concerning Holland and the rest of | the VII United Provinces. | By Sir William Petty, | Fellow of the Royal Society. | Invidiam augendo ulciscar.

London, | Printed for Henry Mortlock at the Phoenix in | St. Paul's Church-yard. 1687.

1 l., recto blank, verso imprimatur in French, 18 February, 1687, 1 l., recto imprimatur in English, same date, verso French title, 1 l., recto English title, verso

Epistre dedicatoire au Roy, concluded on verso of next (fourth) leaf, on whose recto begins the Epistle Dedicatory, To the King's Most Excellent Majesty. This is continued on the recto of leaf five, on whose verso begins page one of the French text. Facing it, on the recto of leaf six, begins page one of the English text. Each text extends to its page 51, 8°.

[22 b—g.] See 26 a—e and 27.

[22 h.] Handgreiffliche | Demonstration, | Dass die | Stadt London in Engeland mit | ihren Vorstädten allein viel mächtiger, grösser, | und Volckreicher sey, | Nicht nur als die | Städte Parise und Rouan, | mit ihren beyderseits Vorstädten zusammen, | Oder als die | Städte Parise und Rome, | mit ihren beyderseits Vorstädten zusammen, | Sondern auch als | Alle diese drey vornehme und grosse Städte, | mit allen ihren Vorstädten zusammen, | So dass | London die grösseste Stadt, und das mäch-|tigste Emporium der gantzen Welt sey, | Aus des berühmten Rittern und der Königl. Englischen | Societät-Curiosorum Verwandten Sr. Wilhelm Petty, | und anderer Authoren Schrifften ausgezogen.

Dantzic, | Gedruckt durch David Frienrich Rheten. | Zufinden bey Martin Hallervordt in Königsberg. | Im Jahr 1693.

Pp. 1—24, 4°. — Title in red and black. The first 15 pp. are a loose version of the 1st, 2nd, 4th and 5th of Petty's Five Essays, the remainder is from other sources. Professor John writes that the translator was Gottfried Schultz. Cf. p. 318 note.

[22 i.] Handgreiffliche Demonstration, | Dass die | Stadt London in Engeland mit | ihren Vorstädten allein viel mächtiger, grösser, | und Volckreicher sey, | Nicht nur als die | Städte Paris und Rouan, | mit ihren beyderseits Vorstädten zusammen, | Oder als die | Städte Parise und Rome, | mit ihren beyderseits Vorstädten zusammen, | Sondern auch als | Alle diese drey vornehme und grosse Städte, mit allen ihren Vorstädten zusammen, | So dass | London die grösseste Stadt, und das mäch-|tigste Emporium der gantzen Welt sey, | Aus des berühmten Rittern und der Königl. Englischen | Societät-Curiosum Verwandten Sr. William Petty, | und anderer Authoren Schrifften ausgezogen.

Dantzic: Zu finden bey Michael Werthen, Anno 1724.

Pp. 1—24, 4°. — A reissue of the 1693 edition, with a new title-page.

[23 a.] Political Arithmetick, | or | a discourse | Concerning, | The Extent and Value of Lands, People, | Buildings; Husbandry, Manufacture [*], | Commerce, Fishery, Artizans, Seamen, | Soldiers; Publick Revenues, Interest, | Taxes, Superlucration, Registries, Banks; | Valuation of Men, Increasing of Seamen, | of Militia's,

Harbours, Situation, Ship-ping, Power at Sea, &c. As the same | relates to every Country in general, but | more particularly to the Territories of | His Majesty of Great Britain, and his | Neighbours of Holland, Zealand, and | France. | By Sir William Petty, | Late Fellow of the Royal Society.

London, Printed for Robert Clavel at the Peacock, | and Hen. Mortlock at the Phoenix in St. Paul's | Church-yard. 1690.

1 l., verso imprimatur 7 Nov. 1690, title, 1 l., dedication, 2 ll., preface, 5 ll., the principal conclusions, 2 ll., errata, 1 l., pp. 1—117, 8°. — * Here a space. The letter "s" has apparently fallen out.

[23 b.] Political Arithmetick, | or | a discourse | Concerning, | The Extent and Value of Lands, People, | Buildings; Husbandry, Manufacture [*], | Commerce, Fishery, Artizans, Seamen, | Soldiers; Publick Revenues, Interest, | Taxes, Superlucration, Registries, Banks; | Valuation of Men, Increasing of Seamen, | of Militia's, Harbours, Situation, Ship-ping, Power at Sea, &c. As the same | relates to every Country in general, but | more particularly to the Territories of | His Majesty of Great Britain, and his | Neighbours of Holland, Zealand, and | France. | By Sir William Petty, | Late Fellow of the Royal Society.

London, Printed for Robert Clavel at the Peacock, | and Hen. Mortlock at the Phoenix in St. Paul's | Church-Yard. 1691.

1 l., verso imprimatur 7 Nov. 1690, title, 1 l., dedication, 2 ll., preface, 5 ll., the principal conclusions, 2 ll., errata, 1 l., pp. 1—117, 8°. — * Here a space. The letter "s" has apparently fallen out.

[23 c.] Political | arithmetick; | or; a | discourse | concerning | The Extent and Value of | Lands, People, Buildings; | Husbandry, Manufacture, | Commerce, Fishery, Arti-zans, Seamen, Soldiers; | Pub-lick Revenues, Interest, Tax-es, Superlucration, Registries, | Banks; Valuation of men, | Increasing of Seamen, of Mi-litia's, Harbours, Situation, | shipping, Power at Sea, etc. | As the same relates to every | Country in general, but more | particularly to the territories | of his majesty of Great Bri-tain, and his neighbours of | Holland, Zealand, and France. | By Sir William Petty, | late fellow of the royal society.

Glasgow, | printed and sold by Robert and Andrew foulis | MDCC LI [1751].

Half-title, 1 l., pp. [i]—x, [11]—97, 8°. — Appended, with separate title-page and pagination but continuous signatures, is Moyle's translation of Xenophon Upon the Revenues of Athens, which is also mentioned on the half-title.

[23 d.] *Same*, 1691 edition, *in* Scarce | Tracts | on | Trade and Commerce | serving as | a Supplement | to | Davenant's Works. | In Two Volumes. | Vol. II. | Published by Sir Charles Whitworth. London : | Printed for Hooper and Davis, No 25, Ludgate-Hill, | and G. Robinson, Pater-Noster Row. | MDCCLXXVIII [1778]. 8°.

[23 e.] *Same*, 1690 edition, *in* An English Garner Ingatherings from our history and literature By Edward Arber, F.S.A. &c. [Quotations.] Volume VI.

E. Arber, 1 Montague Road, Birmingham, England 1 May, 1883. 4°.—Pp. 323—388.

[23 f—j.] See 26 a—d and 27.

[24 a.] The | Political Anatomy | of | Ireland. | With | The Establishment for that King-|dom when the late Duke of Ormond | was Lord Lieutenant. Taken from the | Records. | To which is added | Verbum Sapienti; or an Account of the | Wealth and Expences of England, and the Method | of raising Taxes in the most Equal manner. | Shewing also, That the Nation can bear the Charge | of Four Millions per Annum, when the occasions of | the Government require it. | By Sir William Petty, late Fellow | of the Royal Society, and Surveyor-Genera-|ral of the Kingdom of Ireland. |

London : | Printed for D. Brown, and W. Rogers, at the Bible | without Temple-Bar, and at the Sun over-against | St. Dunstons Church, Fleet-street. 1691.

Title, 1 l., epistle dedicatory 3 ll., preface 1 l., advertisements 1 l., contents, 2 ll., pp. 1—205, half-title of Verbum Sapienti, 1 l., pp. 1—24, 8°. — Signatures continuous throughout.

[24 b.] Sir William Petty's | Political Survey | of | Ireland, | with the | Establishment of that King-|dom, when the Late Duke of Or-|mond was Lord Lieutenant; | and also | An exact list of the present Peers, | Members of Parliament, and principal | Officers of State. | To which is added, | An Account of the Wealth and Ex-|pences of England, and the Me-|thod of raising Taxes in the most equal | manner. | Shewing likewise that England can bear | the Charge of Four Millions per Ann. when | the Occasions of the Government require it. | The Second Edition, carefully corrected, | with Additions. | By a Fellow of the Royal Society.

London: Printed for D. Browne, at the Black Swan, | W. Mears, at the Lamb; F. Clay, at the Bible and Star, | all without Temple-

Bar; and J Hooke, at the Flower-de-Luce, against St. Dunstons-Church in Fleet-Street, 1719.

Title, 1 l., dedication, 2 ll., preface, 1 l., contents, 3 ll., errata, 1 l., pp. 1—223, followed by *Verbum sapienti*, pp. 1—26, signatures continuous, 8°.

[24 c.] *Same*, 1691 edition, in A | collection | of | Tracts and Treatises | illustrative of the | natural history, antiquities, | and the | Political and Social State | of | Ireland, | At various periods prior to the present Century. | In two volumes. | Vol. II. | Treatises by Sir William Petty, Bishop Berkeley, Prior, | and Dobbs. | With an Index.

Dublin: | reprinted by | Alex. Thom & sons, Abbey-Street. | MDCCCLXI [1861]. 8°.—Pp. 1—144.

This Collection was compiled by Mr Thom. Cf. Webb, *Irish Biography*, 594.

[24 d.] See 27.

[25.] An | account | Of several | New Inventions and Improvements | Now necessary for England, | In a Discourse by way of letter | to the | Earl of Marlborough [*sic*], | Relating to | Building of our English Shipping, | Planting of Oaken Timber in the Forrests, | Apportioning of Publick Taxes, | The Conservacy of all our Royal Rivers, in | particular that of the Thames, | The Surveys of the Thames, &c. | Herewith is also published at large | The Proceedings relating to the Mill'd-|Lead-sheathing, and the Excellency and | cheapness of Mill'd-Lead in preference to | Cast Sheet-Lead for all other purposes | whatsoever. | Also | A Treatise of naval philosophy, writ-|ten by Sir Will. Petty. | The whole is submitted to the Consideration of our English | Patriots in Parliament Assembled.

London, Printed for James Astwood, and are to | be Sold by Ralph Simpson at the Harp in St. Pauls | Church-yard. MDCXCI [1691].

1 l., recto blank, verso imprimatur 6 March, 1690, title, 1 l., table 6 ll., pp. i—cxxv. followed by:

The New Invention of mill'd lead for Sheathing of Ships against the Worm... London, Printed in the year 1691.

Title, 1 l., table, 8 ll., pp. 1—132, 2 folded sheets, 12°. The signatures are continuous from p. 1 through the unnumbered ll. following the second title-page, likewise from the second p. 1 to the end. Contains, beginning at p. 117:

A | Treatise | of | Naval Philosophy. | In three parts. | I. A Phisico-Mathematical Dis- | course of Ships and Sailing. | II. Of Naval Policy. | III. Of Naval Oeconomy or | Husbandry.

[26 a.] Several | essays | in | Political | Arithmetick : | The
Titles of which follow in the | Ensuing Pages. | By | Sir William
Petty, | Late Fellow of the Royal Society.

London : | Printed for Robert Clavel at the Peacock, | and
Henry Mortlock at the Phoenix in St. Paul's | Church-Yard. 1699.

1 l., recto blank, verso license to print the Political Arithmetick, dated
7 November, 1690, title, 1 l., contents, 1 l., pp. 1—276, 8°.—Contains an Essay
concerning the Multiplication of Mankind, Further Observations upon the Dublin
Bills of Mortality, Two Essays in Political Arithmetick, Observations upon the
Cities of London and Rome, Five Essays in Political Arithmetick, and the
Political Arithmetick of 1690. Each of these has a separate title-page. The
first two are dated 1698, the others, 1699. The Five Essays are printed in French
and in English on opposite pages.

[26 b.] Essays | in | Political Arithmetick ; | or, a | discourse |
Concerning | The Extent and Value of Lands, People, Buildings ; |
Husbandry, Manufacture, Com-|merce, Fishery, Artizans, Seamen,
Soldiers ; | Publick Revenues, Interest, Taxes, Super-|lucration,
Registries, Banks ; Valuation of | Men, Increasing of Seamen, of
Militia's, | Harbours, Situation, Shipping, Power at | Sea, &c. As
the same relates to every | Country in general, but more particularly |
to the Territories of Her Majesty of Great | Britain, and her Neigh-
bours of Holland, | Zealand, and France. | By Sir William Petty, |
Late Fellow of the Royal Society.

London, | Printed for Henry and George Mortlock, at the
Phoenix | in St. Paul's Church Yard. 1711.

Title, 1 l., pp. 1—276, 8°. — The sheets of the 1699 edition reissued with
a new title-page.

[26 c.] *Another edition.* Edinburgh, 1751.—This I have not
seen.

[26 d.] Several | essays | in | Political Arithmetick. | By | Sir
William Petty, Knt. | and | Fellow of the Royal Society. | The
fourth edition, Corrected. | To which are prefix'd, | memoirs | of
the | author's life.

London : | Printed for D. Browne, without Temple-Bar ; J.
Shuck-|burgh, at the Sun, and J. Whiston and B. White, | at Boyle's
Head in Fleet-Street. | M. DCC. LV [1755].

Pp. 1—IV. 1—VI. 1—184, advertisements, 1 l., 8°. — Contents the same
as the 1699 edition save for the omission of the French version of the Five Essays
and the insertion of the "memoirs of the author's life."

[26 e.] Cassell's national library. | Essays | on | Mankind and Political | Arithmetic. | By | Sir William Petty. | [Woodcut.]

Cassell & Company, Limited, 104 & 106 Fourth Avenue, New York. [1888.]

Pp. [1]—192. — Forms Vol. III. no. 145 of Cassell's National Library. Edited with an introduction by H[enry] M[orley]. Reprinted from the 1699 edition of the Several Essays, with the omission of the Political Arithmetick, for which is substituted (pp. 133—192) an account "Of the people of England. Founded upon the calculations of Gregory King, Lancaster Herald, and forming part of 'An essay [by Charles Davenant] upon the probable methods of making a people gainers in the balance of trade,' published in 1699." There is also an issue with the imprint London, Paris, New York and Melbourne.

[27.] Traçts; | chiefly relating to | Ireland. | Containing: | I. A Treatise of taxes and contri-|butions. | II. Essays in political arithmetic. | III. The political anatomy of Ireland. | By the late Sir William Petty. | To which is prefixed | his last will. | [Orna-ment.]

Dublin: | Printed by Boulter Grierson, Printer to the | King's Most Excellent Majesty. | MDCCLXIX [1769].

Pp. 1—xxiv. 1—488, 8°. — The Treatise of Taxes is reprinted from the edition of 1679 (6 c), the Essays from that of 1699 (26 a), the Political Anatomy from that of 1719 (24 b).

[28.] Of making cloth with sheeps wool. *In* History of the Royal Society... By Thomas Birch... Vol. I.

London: Printed for A. Millar in the Strand. MDCCLVI [1756]. 4°.—Pp. 55—65.

[29.] The Elements of Ireland, and of its Religion and Policy, by Sir William Petty, Fellow of y^e Royal Society, 1687. (Printed in part in W. H. Hardinge's paper On an Unpublished Essay on Ireland, by Sir William Petty, 1687, *in* The Transactions of the Royal Irish Academy. Volume xxiv. Antiquities.

Dublin: Published by the Academy. 1873. 4°—Pp. 371—377.)

[30.] What a Compleat Treatise of Navigation should contain. Drawn up in the Year 1685, by Sir William Petty, late Fellow of the Royal Society. *In* Philosophical Transactions, Vol. xvi. no. 198, pp. 657—658, March, 1693.

[31.] History | of the | Cromwellian survey of Ireland, | A.D. 1655—6, | commonly called "The Down Survey." | Edited, | from

manuscripts in the libraries of Trinity College, Dublin, the King's Inns, Dublin, | and the Marquis of Lansdowne, | by | Thomas Aiskew Larcom, | F.R.S., M.R.I.A., Etc., | Major, Royal Engineers. | [Woodcut.]

Dublin: | for the Irish Archæological Society. | MDCCCLI [1851].

Title, 1 l., list of officers, 1 l., pp. i—xxiii. 1—426, 4°.

[32.] Observations upon the trade in Irish cattle.

Without place or date. Broadsheet—Description taken from no. 5597 of a Catalogue of the most extensive, valuable and truly interesting collection of curious books now on sale in this or any other country. Offered by Thomas Thorpe, 178, Piccadilly, London [1842], 8°. Cf. note on p. 161.

[33.] A Geographical Description of y^e Kingdom of Ireland. | Collected from y^e actual Survey made by Sr. William Petty | Corrected & amended, by the advice, & assistance, of severall Able | Artists, late Inhabitants of that Kingdom. | Containing one General Mapp, of y^e whole Kingdom, with | four Provincial Mapps, & 32. County Mapps, divided into | Baronies, where in are described y^e Cheife Cities, Townes, Rivers, | Harbours and Head-lands, &c^a. | To which is added a Mapp of Great Brittain and Ireland, | together with an Index of the whole. | Being very usefull for all Gentlemen, and | Military Officers, as well for Sea, as for Land Service.

Engraven & Published for y^e benefit of y^e Publique, by Fra : Lamb. | and are to be Sold at his House in Newgate streete, next door but one | to y^e White Swan, toward y^e Gate. By Rob : Morden at y^e Atlas in Cornhill. | Will : Berry at the Globe at Charing Cross And by | John Sellar Ju : at y^e West end of S^t Pauls London. [No date.]

Engraved title with engraved border on double page, index 1 l., 38 double-page maps, about 6 × 4½ inches. Also issued on large paper with coloured maps and the imprint: By John Seller | Sold at His Shop at the Hermitage in | Wapping.

[34.] Hiberniæ | Delineatio quoad hactenus | licuit, Perfectissima | Studio Guilielmi Petty Eq^{ti}s : Aurati. | Continens tabulas sequentes vulgò dictas | A Generall Map of Ireland 1 | The Province of Leinster 2 | The Province of Munster 3 | The Province of Ulster 4 | The Province of Connaught 5 || In Leinster | Louth and Dublin 6 | East Meath 7 | West Meath 8 | Longford 9 | Kings County 10 | Queen's County 11 | Catherlogh 12 | Kildare 13 | Kilkenny 14 |

Wicklow 15 | Wexford 16 || In Munster | Clare 17 | Tipperary 18 |
 Lymrick 19 | Waterford 20 | Corke 21 | Kerry 22 || In Ulster |
 Dunnagall 23 | Londonderry 24 | Tyrone 25 | Antrim 26 | Downe 27 |
 Ardmagh 28 | Monaghon 29 | Fermanagh 30 | Cavan 31 || In
 Connaught | Letrun 32 | Mayo 33 | Slego 34 | Roscommon 35 |
 Gallway 36.

No place or date, folio. Most copies have prefixed a portrait of "Sr William Petty, 1683," Edwyn Sandys sculp. The British Museum Catalogue of Printed Maps assigns this atlas to 1685. But the general map of Ireland (Sutton Nicholls sculp.), which bears the title "An Epitome of Sr William Petty's Large Survey of Ireland...By Phillip Lea. At the Atlas and Hercules in Cheapside near Fryday Street London And in Westminster Hall near ye Court of Common Plea's," contains an engraved advertisement of "The History of Ireland From the Conquest thereof by the English to this Time By Richard Cox Esqr. Printed For Joseph Watts at ye Angell in St Pauls Church Yard." The first volume of Cox's History of Ireland was not published until 1689. Of the six copies of *Hiberniæ Delineatio* which I have seen, five lack the general map. Sometime between 1719 and 1751 George Grierson reissued this atlas with a dedication to Henry, Lord Shelburne. The different county maps from this atlas also occur separately.

SUPPLEMENT TO THE BIBLIOGRAPHY OF
PETTY'S WORKS.

The "Collection of Sir William Petty's Works since the year 1636, found at Wycombe, in his own handwriting," is here reprinted from Fitzmaurice's "Life of Petty" as a supplement to the bibliography of his printed works. To the items which are now known to exist in print, their numbers in the Bibliography have been added.

Caen.	{	1637.	A course of practicall Geometry and Dialling.
		1638.	Cursus Rhetorices et Geographicæ.
London.	{	1639.	A system of Astronomy { Ptolemaical and Copernican.
		1640.	Severall Drawings and Paintings.
		1643.	An English Poem of Susanna and the Elders. Collegium Logicum et Metaphisicum.
Holland.	{	1644.	A Collection of the Frugalities of Holland.
(lost at sea.)		1645.	An History of seven Months practice in a Chemical Laboratory.
Paris.	{	1646.	A Discourse in Latin, 'de Arthritide et Lue Venereâ'; and 'Cursus Anatomicus.'
Oxford.			
	{	1647.	Advice to Mr. Hartlib about the advance- ment of learning [Bibliography, no 3]. Collections for the History of Trees, etc. [Should this read History of Trades? Cf. pp. xv, lxiv, 118 n.].
London.			
	{	1648.	The double writing Instrument [1, 2]. The engine for planting Corne, and Print- ing; Boyling Waters, Woods.
Oxford.		1649.	Six Phisico-Medicall Lectures, read at Oxford.

- | | | | |
|----------|---|-------|---|
| London. | } | 1650. | Several Musick Lectures. Hester Ann Green [cf. p. xv].
Three Osteological Lectures. |
| | | 1651. | Collection of Experiments. |
| | | 1652. | Pharmacopœa and formula Medicamentorum.
Observationes Medicæ et Praxis. |
| | | 1653. | De Plantis. Notæ in Hippocratem.
Scholaris situlifuga. Poemata Liturgica. |
| Ireland. | } | 1654. | A discourse against the Transplanting into Connaught. |
| | | 1654. | A Treatise of Irregular Dials. |
| | | 1655. | The Grand Survey of Ireland. [Pp. xvi—xx.] |
| | | 1656. | Severall Reports about setting the Quarters and Soldiers. |
| | | 1657. | Breviar-ia, Clerk of the Council. |
| | | 1658. | Letters, etc., between the Protector and the Lieut. Gov. of Ireland. |
| | | 1659. | The History of the Survey and first Distribution of Lands in Ireland [3]. |
| | | 1660. | Brev: against Sankey [4], and Sir William Petty's own apology [? 5]. |
| | | 1660. | Observations on the Bills of Mortality [cf. Introduction, pt. iii]. |
| | | 1661. | A Discourse about Registry, and Settlement of Ireland. |
| | | 1662. | A Treatise of Taxes [6] { Materialls of a Bill [cf. p. 398 n.] and Small money. |
| | | 1663. | The Grand Maps of Ireland [34, cf. p. 6 n.] and Brev. of Boroughs.
The Natural History { History of Clothing. of Religion. { History of Dyeing [7].
Satyricall Poems. |
| | | 1664. | Naval Experiments and Discourses { De motu maris et ventorum. De medicinis solutis per aquam et aera. [see pp. xxii, xxiii]. Navicula Gemina [see p. xxii]. Reterium Nauticum. Anatomia Navalis [see p. xxii n.]. |

1665. Verbum Sapienti,
and the value of
People [24].
English Translation of Hermes, per Alex.
Brome.
1667. Lawsuits.
1668. Poemata Glanarita.
1669. Severall Latine Epigrams.
1670. Anatomia Politica Hiberniæ [24].
1671. Political Arithmetick [23].
1682. Quantulumcunque concerning money [10].

This list does not mention all the works which Petty wrote before 1682, and on the other hand it mentions some (e.g. in 1655, 1667) which were not written works at all. Two entries appear of what might be economic pamphlets. Of one, the "Discourse about Registry," 1661, I have found no trace. The other, the "Discourse against transplanting into Connaught," is described by Lord Edmond Fitzmaurice as a pamphlet entitled "A Discourse against the Transplantation into Connaught," of which two editions are said to have been published at London, both anonymously, one in January and one in March, 1665.—Life of Petty, 32. A more exact title seems to be:

The great | case | of transplantation | in | Ireland | discussed : |
or, | Certain Considerations, wherein the | many great inconveni-
encies in the transplan-|ting the Natives of Ireland generally out of
the three | Provinces of Leinster, Ulster, and Munster, into | the
Province of Connaught, are shewn. | Humbly tendered to every
individual Member | of Parliament, by a Well-wisher to the good of
the Common-wealth of England. | [Ornament.]

London, Printed for John Cook, and are to be sold at | his
shop at the sign of the Ship in St. Paul's | Churchyard. 1665.

Title, 1 l., pp. 1—32, 4°. There is also another edition having a title-page like the above in wording and disposition, but from different type, and this imprint: London, Printed for I. C., 1655.

In criticism of this pamphlet was published :

The interest of England in the Irish Transplantation, stated :
Wherein is held forth to all concerned in Ireland's good settlement
the benefits the Irish Transplantation will bring to each of them in

particular, and to the Commonwealth in general, being chiefly intended as an Answer to a scandalous, seditious Pamphlet, entitled [The great Case of Transplantation in Ireland discussed]. Composed and published at the request of several persons in eminent place in Ireland, to the end all who desire it, might have a true Account of the Proceedings that have been there in the business of Transplantation, both as to the rise, progress, and end thereof. By a faithfull Servant of the Common-wealth, Richard Laurence.

London, Printed by Henry Hills, and to be sold at the Sign of Sir John Oldcastle near Py-Corner, MCDLV [1655].

Title, 1 l., pp. 1—29, 4°.

A reply soon appeared under the title :

The | author | and | Case of Transplanting | the | Irish into Connaught | vindicated, | from the unjust Aspersions of Col. Richard Laurence. | By Vincent Gookin Esquire. | [Ornament.]

London, Printed by A. M. for Simon Miller at the Signe of | the Starre in St. Pauls Church-yard. [May 12.] 1655.

Title, 1 l., epistle dedicatory, 1 l., pp. 1—59, 4°. — All three pamphlets are in the Halliday Collection in the Library of the Royal Irish Academy, in the Library of King's Inns, Dublin, and in the British Museum. An account of The Great Case may be found in Prendergast's *Cromwellian Settlement*, pp. 54—64.

Lord Edmond Fitzmaurice's reason for regarding Petty as one of the authors of the first pamphlet is that "the published book bears the marks of joint authorship, the opening sentences—an elaborate medical comparison between the State and the human body—being altogether in Petty's style as well as the later portions, where the arguments are of exactly the same character as those in the *Political Anatomy of Ireland*, ch. iv." These similarities do indeed strengthen the presumption of Petty's collaboration in "The Great Case" which may well arise from his mention of "A Discourse against the Transplanting into Ireland." But they do not seem to me conclusive, and there are direct arguments against Petty's authorship. So far as the probabilities are concerned it may be noted that Gookin and Petty were personal friends and political allies¹, and as such would naturally take similar views of the Rebellion of 1641. This seems to me to account sufficiently for the parallelism between some passages of "The Great Case" and of the "Political Anatomy." Nor does the use,

¹ Fitzmaurice, 31, 51, 77—81.

of indefinite anatomical metaphors in a discussion of political facts, of necessity imply that the author of the "Case," had had a medical education. The two most famous among modern biological sociologists were educated, one as a civil engineer, the other as a clergyman, but both make use of such figures of speech as Gookin employed; and the putative author of the twelfth chapter of First Corinthians was by trade a tent maker. On the other hand Gookin, upon the first page of his vindication, distinctly claims the sole authorship of "The Great Case." He says: "Whilst anything of Reputation might have been the effect of writing the Case of Transplantation, I was content to take the labour to myself and leave the good to others: This was the reason of silencing my name at first. But now what I intended for good is come to be thought so ill, I must leave that resolution and assert my own act....But though I did not think then fit to put my name in Print, yet did not that Trifle steal out in so clandestine a way as that the Parent was hid from all, but being laid at my door, I owned it." Accordingly I regard Gookin as the author of "The Great Case of Transplantation," and have not included it among Petty's Economic Works.

BIBLIOGRAPHY OF THE NATURAL AND POLITICAL OBSERVATIONS.

Natural and Political | observations | Mentioned in a following
Index, | and made upon the | Bills of Mortality. | By John
Graunt, | Citizen of | London. | With reference to the Government,
Religion, Trade, | Growth, Ayre, Diseases, | and the several Changes
of the | said City. |—Non, me ut miretur Turba, laboro, | Contentus
paucis Lectōribus.—

London, | Printed by Tho: Roycroft, for John Martin, James
Allestry, | and Tho: Dicas, at the Sign of the Bell in St. Paul's |
Church-yard, MDCLXII [1662].

Title, 1 l., epistles dedicatory, 3 ll., index, 4 ll., pp. 1—79, 82—85 and 2
folding tables not included in the pagination, 4°. — The verso of p. 79 is
misnumbered 82.

Natural and Political | observations, | Mentioned in a following
Index, | and made upon the | Bills of Mortality. | By John
Graunt, | Citizen of | London. | With references to the Govern-
ment, Religion, Trade, | Growth, Ayr, Diseases, and the several
Changes of the | said City. |—Non, me ut miretur Turba, laboro, |
Contentus paucis Lectōribus.— | The Second Edition.

London, | Printed by Tho: Roycroft, For John Martin, James
Allestry, | and Tho: Dicas, at the Sign of the Bell in St. Paul's |
Church-yard, MDCLXII [1662].

Title, 1 l., epistles dedicatory, 3 ll., index, 4 ll., pp. 1—79, and 2 folding
tables not included in the pagination, 4°.

Natural and Political | observations | Mentioned in a following
Index, | and made upon the | Bills of Mortality. | By | Cāpt. John
Graunt, | Fellow of the Royal Society. | With reference to the
Government, Reli-|gion, Trade, Growth, Air, Diseases, and the |

Bibliography of the Natural and Political Observations. 659

several Changes of the said City. |—Non, me ut miretur Turba, laboro, | Contentus paucis Lectoribus.— | The Third Edition, | much Enlarged.

London, | Printed by John Martyn, and James Allestry, | Printers to the Royal Society, and are to be sold at the | sign of the Bell in St. Pauls Church-yard. | MDCLXV [1665].

1 l., recto blank, verso order of the Council of the Royal Society to print, title, 1 l., epistles dedicatory, 7 ll., index 6 ll., 1 blank l., pp. 1—205, and two folding tables not included in the pagination, 4°.

Natural and Political | observations | Mentioned in a following Index, | and made upon the | Bills of Mortality. | By | Capt. John Graunt, | Fellow of the Royal Society. | With reference to the Government, Reli-gion, Trade, Growth, Air, Diseases, and the | several Changes of the said City. |—Non, me ut miretur Turba, laboro, | Contentus paucis Lectoribus.— | The Fourth Impression.

Oxford, | Printed by William Hall, for John Martyn, | and James Allestry, Printers to the | Royal Society, MDCLXV [1665].

1 l., recto blank, verso order of Royal Society to print, title, 1 l., epistles dedicatory 7 ll., index, 6 ll., 1 blank l., pp. 1—205, and two folding tables not included in the pagination, 8°.

Natural and Political | observations | Mentioned in a following index, | and made upon the | Bills of Mortality. | By Capt. John Graunt, | Fellow of the Royal Society. | With reference to the Government, Reli-gion, Trade, Growth, Air, Diseases, and the | several Changes of the said city. |—Non, me ut miretur Turba, laboro, | Contentus paucis Lectoribus.— | The Fifth Edition, much Enlarged.

London, | Printed by John Martyn, Printer to the | Royal Society, at the Sign of the Bell in St. Paul's | Church-yard. MDCLXXVI [1676].

1 l., recto blank, verso, order of Royal Society to print, title 1 l., epistles dedicatory, 9 ll., index, 6 ll., preface 3 ll., pp. 1—150, and two folding tables not included in the pagination, 8°. —According to Dr Campbell and James Milne this edition was prepared by Petty.

The Natural and political observations were also reprinted by Dr W. Heberden in his Collection of the yearly bills of mortality, 1759. See no. 13 b of the bibliography of Petty.

Natürliche und politische | Anmerkungen | über die | Todten-Zettul | der stadt Londen [*sic*], | fürnemlich | ihre regierung, religion,

gewerbe, vermeh-|rung, lufft, kranckheiten, und besondere verän-
derungen betreffend. | Anfangs | in Englischer sprache abgefasset, |
und offtermals durch den druck herausgegeben | vom | Capitain
Johannes Graunt, | Mitgleid der Königl. Societ. | nun | aber | um
des grossen nutzens willen, der dem gemei-|nen wesen Teutschlands
insgemein, und iedes orts | insonderheit aus solchen todtten-registern
zu-|wachsen kan, | ins Deutsche übersetzt. | [Woodcut.]

Leipzig, bey Thomas Fritschen, | 1702.

Title, 1 l., Vorrede des Ubersetzers (*sic*), 2 ll., Zuschriften Graunts, 4 ll.,
Vorrede des Autoris, 1 l., Register, 4 ll., pp. 1—112, 1 folded table, 12°. —
The translator was Dr Gottfried Schultz of Breslau. See p. 318 note.

Note: Graunt did not write the “Reflections On the weekly Bills of Mortality For the Cities of London and Westminster and the places adjacent : But more especially so far as they relate to the plague...London: Printed for Samuel Speed, at the Rainbow in Fleet street. 1665.” This pamphlet was issued in two editions, both in quarto. All that is of value in either of them was filched from Graunt, but their compiler appears to have drawn liberally from his own imagination also. They were promptly denounced as spurious by John Bell, clerk to the Company of Parish Clerks, in his “London’s Remembrancer” issued in the same year. Cf. pp. xliii, 426.

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„	lxxxi, note 4,	„	1,1001000	„	1,100,000.
„	214, last line,	„	<i>Ibid.</i>	„	Fitzmaurice.
„	238, note 3,	„	Argier	„	Algier.
„	512, line 11,	„	Nelligan	„	Neligan.
„	547, line 12,	„		„	

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