

Further observations on the state of population in Manchester, etc / [Anon].

Contributors

Percival, Thomas, 1740-1804.

Publication/Creation

[Manchester?] : [publisher not identified], [1774]

Persistent URL

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Further Observations on the State of Population in MANCHESTER, and other adjacent Places.

THE number of inhabitants and progress of population in the kingdom; the increase or decrease of certain diseases; the comparative healthiness of different situations, climates, and seasons; and the influence of particular trades and manufactures on the duration of life, are subjects of the highest importance to the community; and equally interesting to the statesman, the philosopher, and the physician.

"I HAVE somewhere read," says Dr. Franklin (in the remarks on my former paper with which he has lately favoured me) "that in China an account is yearly taken of the number of people, and the quantities of provision produced. This account is transmitted to the Emperor, whose ministers can thence foresee a scarcity likely to happen in any province, and from what Province it can best be supplied in good time (*a*). To facilitate the collecting of this account, and prevent the necessity of entering houses and spending time in asking and answering questions, each house is furnished with a little board to be hung without the door during a certain time each year, on which board are marked certain words, against which the inhabitant is to mark number or quantity, somewhat in this manner.

Men
Women
Children
Rice or Wheat
Flesh, &c.



"All under 16 are accounted children, and all above, men and women. Any other particulars which the government desires information of, are occasionally marked on the same boards. Thus the officers appointed to collect the accounts in each district, have only to pass before the doors, and enter into their book what they find marked on the board, without giving the least trouble to the family. There is a penalty on marking falsely; and as neighbours must know nearly the truth of each other's account, they dare not expose themselves by a false one, to each other's accusation. Perhaps such a regulation is scarcely practicable with us."

BUT an enumeration of the people of England, similar to that lately executed at Manchester, would not be so difficult an undertaking, as may at the first view be imagined. And if accurate and comprehensive Bills of Mortality were universally established, they would admirably coincide

(*a*) China, like all other countries that subsist chiefly upon rice, is subject to frequent famines. *Monesquieu*.

cide with the views of such inquiries, and give precision and certainty to the conclusions deduced from them. (a)

FROM the populousness of this neighbourhood, it may perhaps be supposed, that a great number of burials are brought from the Country to the Collegiate and other Churches in Manchester, and that this circumstance is likely to create uncertainty and error in the calculations made from the parochial register of deaths. But it appears from the best information I can collect, that the number of such burials is not considerable; and that they are pretty exactly balanced by those which are carried out of Manchester to the neighbouring episcopal or dissenting chapels. This fact admits of an easy and satisfactory explanation, were it necessary to trouble the reader with it.

It was remarked in the former paper that wet seasons are generally more free from epidemic diseases than dry ones, and the Bills of Mortality at Manchester seem to confirm the observation: It appears at least from the following table, that the year 1766, remarkable in this climate for the small quantity of rain which fell during the course of it, was more fatal than any of the rest. And the proportion of deaths will be deemed greater when it is recollected, that the town contained at that time fewer inhabitants (probably two thousand) than it does at present. For the rapid increase of Manchester commenced about the year 1765, after the conclusion of the last war.

Year.	Quantity of Rain at Manchester. Inches.	Deaths at Manchester.
1765	31. 378	723
1766	25. 762	1019
1767	29. 056	690
1768	40. 526	867
1769	32. 514	788
1770	39. 363	988
1771 from Jan. 1. to June 1.	6. 8 (b)	

THIS table, it must be acknowledged, does not comprehend a sufficient length of time to admit of any very accurate or incontrovertible conclusions from it. And the influence of other causes of disease, which have little or no relation to the state of the atmosphere, together with the irregularity which necessarily occurs in the annual increase of a large manufacturing town, may be regarded as further sources of fallacy and uncertainty. It is therefore with diffidence I observe, that though wet seasons are less mortal than long continued droughts, yet the rainy years 1768, and 1770 proved extremely sickly and fatal. And those years are probably most unfavourable to health, in which heavy rains fall about the beginning of summer, and are succeeded by great and uninterrupted heats. For the earth being thus drenched with moisture, and the low lands overflowed with water, the exhalations become constant, copious, and often putrid.

JOAN LEO in his history of Africa relates that if heavy rains fall in that country during the months of July and August, the plague usually breaks out the September following (c). But in European climates it is well remarked by Sir John Pringle that frequent showers in summer cool the air, check the excess of vapour, dilute and refresh the corrupted waters, and precipitate

(a) Vid. The Author's Proposals for establishing accurate Bills of Mortality in Manchester. Essays Medical and Experimental, Vol. 2. These Proposals have been adopted, and with a few variations carried into execution by Dr. Haygarth at Chester, and by Mr. John Aikin at Warrington.

(b) THIS account of the quantity of rain, was communicated to me by George Lloyd, Esq. F.R.S. The observations were made at his seat, about a mile distant from the centre of Manchester, and were continued only till June 1771. The situation of my own house, and my frequent and distant calls into the country prevent me from undertaking such experiments myself.

(c) Hist. Africae, Lib. 1. Cap. 10.

tate the noxious effluvia which float in the atmosphere (*a*). And it appears from a variety of observations which I have collected, that October, November and December are generally very healthy, although the most rainy months in the year. I shall subjoin a table which will set this point in the clearest light, and at the same time shew the comparative Mortality of the different seasons at Middleton, Bowden, Chowbent, Disley, Middlewich, Richmond, and Manchester.

A TABLE SHEWING THE COMPARATIVE MORTALITY OF THE DIFFERENT SEASONS OF THE YEAR.

	Middleton from 1663 to 1673. Ten years.	Middleton from 1763 to 1773. Ten years.	Bowden from 1663 to 1673. Ten years.	Bowden from 1763 to 1773. Ten years.	Manchester from 1766 to 1774*. Eight years.
January } February } March }	117.	265.	179.	259.	1538.
April } May } June }	99.	291.	139.	300.	1366.
July } August } September }	79.	215.	114.	209.	957.
October } November } December }	72.	222.	127.	207.	1339.

	Chowbent from 1767 to 1773. Six years.	Disley from 1763 to 1773. Ten years.	Middlewich from 1768 to 1773. Five years.	Richmond from 1764 to 1774. Ten years.	Total.
January } February } March }	71.	64.	67.	170.	2730.
April } May } June }	37.	78.	55.	156.	2521.
July } August } September }	28.	51.	59.	172.	1884.
October } November } December }	33.	43.	69.	144.	2256.

THERE

(*a*) Vid. Sir John Pringle on the Diseases of the Army, p. 5. Ed. 4.

* This account is taken from the register of the collegiate or parish church only.

THERE is a considerable diversity in the situation of these places. Middleton lies six miles north east of Manchester, not far from the great chain of mountains, which divides Lancashire and Yorkshire, and about thirty six miles from the sea.

BOWDEN is ten miles to the south west of Manchester, and thirty five miles from the sea. It is an elevated situation, in a level country; and at a great distance from any hills.

CHOWBENT is ten miles westward of Manchester, and twenty five miles distant from the sea. It is in a low and flat situation, and near a very extensive morass.

DISHLEY is in that part of Cheshire, which borders on the peak of Derbyshire. It is a mountainous situation, thirteen miles south east of Manchester, and fifty miles from the sea.

MIDDLEWICH is twenty eight miles southward of Manchester, and about forty miles from the sea. It is surrounded by a well cultivated and level country.

RICHMOND is a considerable market town in the north riding of Yorkshire, about forty miles distant from the German Ocean. It stands on an eminence, which terminates a long continued range of mountains. The country below is an extensive, rich and well cultivated plain.

THE observations of Dr. Franklin on the subject of moisture will, I doubt not, be very acceptable to the medical reader, although he may not entirely acquiesce in the opinion of this excellent philosopher. I shall therefore give a further quotation from the letter before referred to. "The gentry of England are remarkably afraid of moisture, and of air. But seamen who live in perpetually moist air, are always healthy if they have good provisions. The inhabitants of Bermudas, St. Helen and other Islands far from continents, surrounded with rocks, against which the waves continually dashing, fill the air with spray and vapour, and where no wind can arise that does not pass over much sea, and of course bring much moisture, are remarkably healthy. And I have long thought mere moist air has no ill effect on the constitution; though air impregnated with vapours from putrid marshes is found pernicious, not from the moisture but from the putridity. It seems strange that a man, whose body is composed in great part of moist fluids, whose blood and juices are so watery, who can swallow quantities of water and small beer daily without inconvenience, should fancy that a little more or less moisture in the air should be of such importance. But we are bound in absurdity and inconsistency. Thus, though it is generally agreed that *taking the air* is a good thing, yet what caution against air! what stopping of crevices! what wrapping up in warm cloaths! what shutting of doors and windows! even in the midst of summer. Many London families go out once a day to take the air, three or four persons in a coach, one perhaps sick; these go three or four miles, or as many turns in Hyde Park, with both the glasses up, all breathing over and over again the same air they brought out of town with them in the coach, with the least change possible, and rendered worse and worse every moment: and this they call *taking the air*. From many years observations on myself and others, I am persuaded we are on a wrong scent in supposing moist or cold air, the cause of that disorder we call a cold: some unknown quality in the air may sometimes produce colds, as in the *influenza*; but generally I apprehend they are the effects of too full living, in proportion to our exercise. Excuse, if you can, my intruding into your province, and believe me ever with sincere esteem, &c."

In the former paper I gave a striking example of the great advantages of diligence and sobriety in *the length of days* which the people of Monton enjoy. Such an instance though a single one, affords the most animating lesson of morality; but I can now enforce it by other proofs that *virtue has the promise of the present life, as well as of that which is to come.*

THE Rev. Mr. Harrop has favoured me with an account of the people who attend Divine Service in the Chapel at Hale, near Altringham, which he has lately taken with a retrospect of the births and deaths amongst them during the last seven years. The society is composed of 140 males, 136 females, 92 married persons, 8 widowers, 12 widows, 105 under fifteen years of age, and 41 above fifty. The deaths during seven years have been 28, and the births 68.

It

It appears from this enumeration that only one in 69 of the people, who are most of them farmers, dies annually. Hale is a low situation, and the soil is clayey.

THE congregation belonging to the Chapel at Horwich consists of 305 individuals, viz. 149 males, and 156 females, 94 married persons, and 9 widowers, 8 widows, 127 under fifteen years of age, and 50 above fifty. The births for the last seven years have amounted to 101, and the deaths to 32. Hence the yearly proportion of deaths to the inhabitants is as 1 to 66. Horwich is between Bolton and Chorley, the country is mountainous, and the people are composed almost equally of farmers and manufacturers. I am obliged to the Rev. Mr. Evans for this account.

THE Rev. Mr. Smalley of Darwen, three miles from Blackburn in Lancashire, has transmitted to me the following survey of his congregation. It consists of 1850 individuals; 900 males; 950 females; 640 married persons; 30 widowers; 48 widows; 737 persons under the age of fifteen, and 218 above 50. During the last seven years the deaths have amounted to 233; and the births to 508. The annual proportion of deaths therefore is 1 in 56; and the births are to the number of inhabitants nearly as 1 to 25.5. Darwen is a country district, bleak and elevated in its situation, surrounded by moors, and ill cultivated. The inhabitants are chiefly employed in the cotton manufactory.

A CLERGYMAN in the peak of Derbyshire has, at my desire, undertaken an enumeration of the people of Edale, a fertile valley in that part of the county, inhabited by a sober and industrious race of farmers. But I have not yet received a particular account of the survey; and have only been informed that 1 in 59 of the inhabitants dies annually, on an average of ten years.

THE principles and manners of the Quakers, though often made the subjects of illiberal censure and ridicule, may probably afford them advantages with respect to the duration of life over other bodies of men. The diligence, cleanliness, temperance and composure of mind, by which the members of this society are in general distinguished, may reasonably be supposed to contribute to health and longevity: And as there are no persons among them in abject poverty, and few immoderately rich, this more equal distribution of property must lessen the sources of disease, and furnish every individual under it with the necessary means of relief. These considerations excited my curiosity to know the proportion of deaths amongst the Quakers in Manchester, and I have been gratified by Mr. Routh, in the most obliging manner, with the following information. The society consists of 81 males; and 84 females; 54 married persons; 9 widowers; 7 widows; and 48 persons under fifteen years of age. The births during the last seven years have amounted to 34; and the burials to 47. About 1 therefore in 24.6 of the Quakers in Manchester dies annually; whereas the proportion of deaths amongst the inhabitants of the town at large is as 1 to 28. If no allowance be made for the temporary and accidental irregularities which may occur in a single and small body of men, when the average of a few years has only been taken, a conclusion directly contrary to what I have presupposed, will be drawn from this fact. And perhaps it will be urged that the want of vivacity in the people of this sect, and the sedentary lives of their females, are causes which shorten the period of their existence, and counterbalance the advantages from cleanliness and sobriety which they enjoy. But the reader will entertain a different opinion concerning this point, when he is informed that the Quakers here have had few or no accessions to their number, by supplies from other places, during the last seven years. This must considerably increase their proportional mortality, for reasons which have been before assigned; and is the true cause why the deaths amongst them so much exceed the births. Were it not for new settlers in the prime of life, who annually pour into Manchester, it is probable that more than 1 in 25 of its inhabitants would die annually. So baleful is the influence of large towns on the duration of life; and so justly are they styled, by a writer of the most distinguished abilities, the *graves* of mankind.

THE Rev. Mr. Barnes, whom I cannot mention without expressions of esteem and friendship, made a survey in September, 1773, of the people belonging to the new chapel at Cockey Moor, near Bolton, the particulars of which are as follow :

Houses	150	Families	154
Males	320	Females	391
Married Persons	248	Widowers	10
Widows	27	Under fifteen	252
Above fifty	99	Births in five years	125
Deaths in seven years	114	Total number of people	711

THE married persons in this society are therefore to the single as 1 to 1.867; the widows are nearly treble the number of widowers; a seventh part of the people have attained the age of fifty, and those under fifteen exceed one third of the whole congregation. The average number of births is 25 every year, and of deaths $16\frac{2}{7}$; so that the former are to the latter in the proportion of somewhat more than 5 to 3; and 1 person in about 44 dies annually. It should be remarked that the number of deaths in this period was considerably increased by the uncommon fatality of the small-pox in the year 1770. Cockey Moor is surrounded by a cold, wet, and barren country; the inhabitants are farmers and manufacturers.

THE congregation belonging to the chapel at Chowbent consists of 1160 persons, viz. 554 males; 606 females; 173 males and 150 females under ten years of age; 83 males and 91 females above fifty; 6 males and 4 females above eighty; 199 married couples; 26 widowers; and 43 widows. The baptisms during six years (wanting six weeks) have amounted to 293; and the deaths to 169. About 1 therefore in 41, 2 of this society dies annually. This survey was made in November 1773, by the Rev. Mr. Mercer. The people of Chowbent are employed chiefly in the manufactories of Cotton, Linen, and Iron.

AT Ackworth, near Ferry-bridge in the county of York, the christenings and burials for ten years, viz. from March 25, 1757, to March 25, 1767, have been as follow:

Christenings.

Males	104
Females	108
Total	212

Burials.

Males	79
Females	77
Total	156

Of this number have died,

	Males.	Females.	Total.	DISEASES.	Males.	Females.	Total.
Under two years old	18	13	31	Child-bed	0	2	2
Between 2 and 5	9	7	16	Chincough	0	2	2
5 and 10	4	1	5	Consumption	23	15	38
10 and 20	2	2	4	Diabetes	1	0	1
20 and 30	7	5	12	Fever	12	11	23
30 and 40	3	8	11	Infants	7	6	13
40 and 50	2	4	6	Measles	0	2	2
50 and 60	11	3	14	Old Age	11	19	30
60 and 70	13	13	26	Small Pox	7	6	13
70 and 80	7	14	21	Dysentery	1	1	2
80 and 90	3	6	9	Dropfy	0	3	3
90 and 100	0	1	1	Apoplexy	2	1	3
Of all ages in ten years	79	77	156				

In

In this parish there are { 184 Houses, eleven of which are uninhabited.
728 Persons, of the following ages, viz.

	Males.	Females.	Total.		Males.	Females.	Total.
Under 2 Years old -	31	25	56	Between 40 and 50 -	31	38	69
Between 2 and 5 -	32	36	68	50 and 60 -	28	32	60
5 and 10 -	34	38	72	60 and 70 -	20	28	48
10 and 20 -	50	51	101	70 and 80 -	7	10	17
20 and 30 -	44	63	107	80 and 90 -	2	4	6
30 and 40 -	61	62	123	90 and 100 -	0	1	1
				Of all Ages---Total	340	388	

THIS account of Ackworth was lately transmitted to my friend Mr. White, by the Rev. Dr. Lee, Rector of the Parish. It appears that 1 in 46.6 of the inhabitants dies yearly; and that the proportion of persons to each tenanted house is $4\frac{1}{3}$. Amongst the males under 2 years of age, the number of deaths exceeds by a third those amongst the females; and 43 women and only 29 men have attained the age of sixty and upwards. These facts (and I could adduce many similar ones) confirm a curious remark lately advanced by Dr. Price, that the life of males is more frail than that of females.

I SHALL conclude this Paper with a Table deduced from the preceding observations.

A TABLE shewing the Proportion of Inhabitants dying annually in several different Places.

MANCHESTER.	LEVERPOOL.	CHOWBENT.	EASTHAM.	COCKEY.	ROYTON.
I. in 28.	I. in 27.	I. in 41.	I. in 35.	I. in 44.	I. in 52.
DARWEN.	EDALE.	ACKWORTH.	HORWICH.	HALE.	MONTON.
I. in 56.	I. in 59.	I. in 47.	I. in 66.	I. in 69.	I. in 68.

MANCHESTER, Feb. 1st, 1774.

N. B. *The former Observations are inserted in the Philosophical Transactions: This Paper is intended also for the ROYAL SOCIETY; but a few copies have been printed for the Author's Friends in Manchester.*

