The second case is only interesting in one part of its pathology, and that relates to the combination of scrofula with carcinoma. This is a rare occurrence, and one which I should term accidental. I have inspected the bodies of a number of patients who have died from the effects of medullary sarcoma, and only in one instance did I find any sign of scrofulous tubercles, and they were in the lungs, and of the miliary kind.

I have seen such unfavourable results after operating for cancerous or fungoid affections, that I have determined never to propose an operation, or again to perform one, in either disease, unless at the particular desire of the patient, and with his consent to abide by the consequences, without reproach against the surgeon.

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In exhibiting the law of mortality of the aggregate population of England, I have gone to the full extent allowed by the materials, and compared the mortality in each of thirteen gradations of age. A comparison to the same extent might have been instituted for each county, but the results would have been less valuable, being founded upon observations of very inferior magnitude. According to the doctrine of chances, the smaller the number of facts, the less correct is the indication of the general law which these facts obey. When the intervals of age are very small, and when the differences between the mortality at consecutive intervals are also small, the true law of mortality is never correctly indicated, unless the facts observed are of immense magnitude. During infancy, the mortality at one annual interval differs 32 per cent. from the mortality of the succeeding annual interval; and on account of this great difference, a small number of observed facts are sufficient to determine the true law at this period. But between the ages of fifteen and fifty-five years, the mortality at any annual interval differs only one-thirtieth part from the mortality of the next annual interval; and we cannot expect to find any materials of sufficient amplitude to indicate correctly these minute differences. By extending the intervals of age observed, we increase the weight by diminishing the number of the results. We also thus increase the differences between the mortality at two consecutive intervals, which is a point of

considerable importance. For example, if two consecutive results, when the intervals are small, differ by the amount of 10 per cent., and other two consecutive results, when the intervals are larger, differ by the amount of 30 per cent., a much greater number of facts will be requisite for determining the approximate value of the smaller than that of the larger difference. For reasons of this nature, in comparing together the mortality of different counties, I have extended the intervals, and reduced the thirteen to five gradations of age. I consider that the numbers thus obtained are of nearly equal weight with the numbers obtained for the aggregate population in smaller intervals of age. No useful information has been lost by this proceeding, for I have taken care to draw the lines of division in such a manner as to include the parts most nearly allied to each other. To prevent the possibility of any mistake on this head, I have obtained for nearly all the counties of England, the resulting mortality for each of the thirteen gradations of age. As I have not met with one instance of a decided variation from the scale of relative mortality already exhibited for the aggregate population, there appears to be no reason for desiring the publication of the results for smaller intervals of age than those which I have adopted.

In classifying the different counties of England, I have arranged them principally according to the rate of mortality of females between the ages of fifteen and sixty years. But I have not separated counties in juxtaposition, when the difference in the rates of mortality was inconsiderable. The mortality of males at the same interval of age would not serve as a good index to the healthfulness of a locality, unless we could abstract the detrimental effect of their occupations, leading to fatal accidents, or to loss of health. In many counties, also, the uncertain amount of the military and maritime population, diminishes considerably the value of the apparent mortality of the male sex. Another valuable classification might be made, grounded on the mortality under the age of fifteen years, but much preliminary labour would be requisite, in order to abstract the influence of large towns. For example, the mortality in Devon, under the age of five years, is nearly 25 per cent. greater than in Cornwall, and yet it is doubtful whether the climate of Devon is less favourable to infant life than that of Cornwall. The greater part of the excess may be accounted for by the accident of Cornwall not containing a large town like Plymouth, the mortality of infants in large towns being nearly twice as great as in the adjacent country. A classification more valuable and more complex than that which I now present, may be made hereafter, when much local knowledge has been concentrated on the subject.

| Wales and the Forty-two Counties. | Males (without correction). | | | | | | Females. | | | | | | Living in 1821. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 | 5 15 | 15 30 | 30 60 | Above 60. | All ages. | 0-5 | 5 15 | 15 30 | 30 60 | Above 60. | All Ages. | |
| 1 { Cornwall | 3.59 | .50 | .79 | 1.41 | 7.63 | 1.82 | 3.12 | .52 | .67 | 1.10 | 7.18 | 1.67 | 133 |
| Devon | 4.55 | .53 | .82 | 1.43 | 7.56 | 2.04 | 3.96 | .54 | .71 | 1.23 | 7.12 | 1.85 | 231 |
| 2 { Wales | 3.84 | .53 | .90 | 1.38 | 7.50 | 1.90 | 3.38 | .52 | .75 | 1.25 | 7.08 | 1.79 | 367 |
| Monmouth | 4.23 | .49 | .76 | 1.25 | 7.12 | 1.79 | 3.51 | .49 | .77 | 1.32 | 6.82 | 1.80 | 35 |
| { Dorset | 3.93 | .47 | .81 | 1.25 | 7.02 | 1.86 | 3 32 | .51 | .85 | 1.35 | 7.12 | 1.81 | 76 |
| Somerset | 4.34 | .56 | .80 | 1.41 | 7.37 | 1.97 | 3.80 | .57 | .83 | 1.34 | 7.09 | 1.87 | 185 |
| Wilts | 3.66 | .49 | .79 | 1.31 | 7.21 | 1.83 | 3.25 | .53 | .87 | 1.46 | 7.40 | 1.84 | 114 |
| 3 { Gloucester | 4.24 | .55 | .83 | 1.48 | 6.80 | 1.91 | 3.55 | .49 | .83 | 1.35 | 6.50 | 1.76 | 175 |
| Hereford | 3.88 | .46 | .78 | 1.28 | 7.66 | 1.90 | 3.13 | .51 | .95 | 1.36 | 7.27 | 1.88 | 52 |
| Northumblnd. | 3.97 | .59 | .88 | 1.38 | 6.73 | 1.90 | 3.35 | .54 | .74 | 1.32 | 6.55 | 1.72 | 104 |
| Cumberland | 4.74 | .61 | .87 | 1.42 | 7.68 | 2.06 | 4.46 | .61 | .81 | 1.35 | 7.32 | 1.98 | 81 |
| { Westmoreland | 3.87 | .67 | .87 | 1.30 | 7.54 | 1.97 | 3.49 | .58 | .93 | 1.47 | 7.85 | 2 03 | 26 |
| North York | 3.79 | .53 | .87 | 1.24 | 7 30 | 1.91 | 3 17 | .55 | .96 | 1.34 | 7.04 | 1 88 | 93 |
| Rutland | 4.37 | .44 | .68 | 1.31 | 7 59 | 1 98 | 3.84 | .55 | .93 | 1.38 | 7.32 | 2.01 | 9 |
| 4 { Norfolk | 5.20 | .54 | .84 | 1 24 | 7.21 | 2.08 | 4.40 | .55 | .88 | 1.31 | 7.02 | 1.97 | 177 |
| Suffolk | 3.73 | .45 | .81 | 1.19 | 6.86 | 1.78 | 3.24 | .49 | .95 | 1.37 | 6.83 | 1.80 | 138 |
| Hertford | 4.48 | .54 | .86 | 1.45 | 8.22 | 2.00 | 4.03 | .54 | .92 | 1.42 | 7.62 | 1.91 | 66 |
| { Durham | 5.34 | .84 | 1.18 | 1.51 | 7.97 | 2.38 | 4.49 | .72 | .91 | 1.54 | 7.53 | 2.14 | 109 |
| East York | 5.48 | .63 | .94 | 1.38 | 7 59 | 2.17 | 4.66 | .60 | .89 | 1.41 | 7.17 | 1.98 | 98 |
| 5 { West York | 5.18 | .62 | .88 | 1.41 | 7.38 | 2.09 | 4.57 | .56 | .93 | 1.48 | 7.32 | 1.98 | 402 |
| Leicester | 5.21 | .52 | .81 | 1.33 | 7.26 | 2.04 | 4.38 | .51 | .91 | 1.41 | 7.30 | 1.95 | 88 |
| Lincoln | 5.13 | .56 | .78 | 1.44 | 7.39 | 2.07 | 4.39 | .58 | .90 | 1.45 | 7.25 | 1.98 | 141 |
| { Salop | 4.56 | .61 | .98 | 1.52 | 7.45 | 2.08 | 3.91 | .57 | 1.02 | 1.42 | 7.37 | 1.98 | 104 |
| Derby | 4.38 | .56 | .92 | 1.29 | 7.38 | 1.94 | 3.72 | .54 | 1.07 | 1.50 | 7.63 | 1.91 | 107 |
| Northampton | 4.64 | .55 | .81 | 1.32 | 7.37 | 2.05 | 3.97 | .63 | 1.10 | 1.52 | 7.49 | 2.08 | 83 |
| Huntingdon | 4.72 | .57 | .84 | 1.55 | 7.65 | 2.09 | 4.21 | .63 | 1.00 | 1.52 | 7.22 | 2.02 | 25 |
| Essex | 4.41 | .56 | .92 | 1.54 | 7.88 | 2 05 | 3 95 | .61 | 1 06 | 1.53 | 7.29 | 1.97 | 145 |
| 6 { Bedford | 4.17 | .58 | .78 | 1.34 | 7.51 | 1.92 | 3.49 | .65 | 1.14 | 1.58 | 7.40 | 1.95 | 43 |
| Bucks | 4.72 | .53 | .81 | 1.34 | 7.65 | 2.05 | 3.98 | .63 | 1.10 | 1.54 | 7 96 | 2.08 | 69 |
| Oxford | 4.97 | .50 | .78 | 1.36 | 7.82 | 2.05 | 4.14 | .53 | .99 | 1.47 | 7.82 | 2.04 | 68 |
| Berks | 4.72 | .53 | .90 | 1.51 | 7 99 | 2.12 | 4.16 | .55 | 1.05 | 1.53 | 7.69 | 2.08 | 66 |
| Southampton | 4.43 | .55 | .99 | 1.53 | 7.88 | 2.10 | 3.77 | .53 | .96 | 1.52 | 7.68 | 1.91 | 145 |
| Sussex | 3.93 | .51 | .91 | 1.35 | 7.16 | 1.87 | 3.21 | .50 | 1.08 | 1.45 | 7.00 | 1.79 | 116 |
| { Lancaster | 6.56 | .71 | 1.04 | 1.64 | 7.66 | 2.40 | 5.78 | .65 | 1.02 | 1.73 | 7.59 | 2.24 | 540 |
| Chester | 5.57 | .71 | 1.07 | 1.63 | 8.20 | 2.32 | 4.78 | .68 | 1.11 | 1.76 | 8.22 | 2.22 | 137 |
| Nottingham | 6.38 | .61 | .90 | 1.41 | 7.18 | 2.27 | 5.37 | .62 | 1.06 | 1.57 | 7.04 | 2.16 | 95 |
| 7 { Stafford | 5.98 | .68 | 1.06 | 1.60 | 7.80 | 2.34 | 5.43 | .62 | 1.07 | 1.58 | 7.41 | 2.20 | 169 |
| Warwick | 6.12 | .63 | .90 | 1.63 | 6.16 | 2.26 | 5.29 | .64 | .93 | 1.53 | 6.03 | 2.08 | 141 |
| Worcester | 5.81 | .65 | .93 | 1.47 | 7.54 | 2.26 | 5.21 | .62 | 1.04 | 1.51 | 7.21 | 2.15 | 94 |
| Cambridge | 5.96 | .71 | .90 | 1.63 | 7.85 | 2.34 | 5.08 | .71 | 1.03 | 1.62 | 7.85 | 2.23 | 62 |
| Kent | 5.60 | .66 | 1.41 | 2.04 | 7.82 | 2.54 | 4.75 | .61 | 1.02 | 1.63 | 7.69 | 2.11 | 216 |
| 8 { Surrey | 7.75 | .71 | 1.05 | 2.12 | 9.81 | 2.81 | 6.40 | .69 | .92 | 1.77 | 8.78 | 2.41 | 209 |
| Middlesex | 8.34 | .84 | 1.06 | 2.46 | 11.02 | 3.03 | 6.77 | .78 | .83 | 1.96 | 10.36 | 2.53 | 611 |
| England and Wales | 5.30 | .61 | .94 | 1.59 | 7.77 | 2.21 | 4.56 | .60 | .93 | 1.52 | 7.53 | 2.05 | 6145 |

The numbers representing the mortality in thirty-nine counties, have been obtained by increasing the registered deaths one-ninth part. In the case of Wales, Monmouth, Middlesex, and Surrey, the increase has been one-fourth part. The relative weight of each observation is indicated by the additional column representing in thousands the amount of the female population of each county.

The general harmony of the results in the foregoing table, appears to be interrupted in two instances only. In the counties of Durham and Kent, the mortality of males between fifteen and thirty years of age is considerably higher than would be expected. In Durham, the excess may be due to accidents in mines; in Kent the excess may be due to deaths of boatmen, or to the omission of an excessive proportion of military and maritime population. The extremely low mortality above the age of sixty years in the county of Warwick is a deceptive appearance consequent on the omission of the ages of the population of Birmingham, which constitutes one-third part of the population of the entire county. The proportion of living above the age of sixty years is much less in large towns than in the country. If the ages of the inhabitants of Birmingham had been included in the general summary of the county, the proportion living above sixty would have been considerably less, and consequently the true mortality would have been considerably higher than the apparent. A deceptive appearance of a similar nature, though inferior in degree, exists in the counties of Gloucester and Northumberland, in consequence of the omission in the county summaries of the ages of the inhabitants of Bristol and Newcastle.

One of the most remarkable and unexpected results presented by the above table, is the fact that the mortality of females between the ages of fifteen and sixty years is greater than that of males at the same period in all cases excepting Cornwall, Devon, and Wales. The difference would be still greater, if allowance were made for deaths by accident, which are more numerous among males than among females. In Cornwall and Wales, the apparent exception may be due to accidents in mining. In Devon the apparent exception may be due to deaths in naval and military hospitals, and to a very high proportion of unenumerated sailors and soldiers. The counties of Middlesex and Surrey are excluded from comparison, because they are subject to laws of mortality peculiar to large towns. I have already stated my reasons for believing that very little error can have arisen from the understatement of the ages of females. The possible error, in comparing together the mortality of the two sexes, is to be diminished by the compensating effect of a similar though inferior disposition in males to understate their ages. In the above table I have thought it preferable to give the apparent mortality of males between fifteen and sixty years of age, without a necessary correction for the unenumerated military and maritime population. It may, however, be acceptable to state the two classes of counties in which the defects are most considerable. Kent, Surrey, Middlesex, Durham, Cumberland, Northumberland, North York, East York, and Devon, require the largest correction. Lancashire, Wales, Gloucester, Cornwall, Norfolk, Essex, Dorset, and Southampton, require a smaller correction. The apparent results for males from fifteen to thirty, and from thirty to sixty, ought probably to be diminished by the quantity .09 in the first mentioned counties, and by .05 in those last mentioned, the reduction for all England being about .06 at each of these two periods.

In the case of Cornwall, Devon, and Wales, there appears to be some ground for the conjecture, that the relatively high mortality of the male to the female sex, arises from original peculiarity in the constitution of the inhabitants, The proportion of male to female births in these districts, differs very much from the proportion existing in the rest of the observed territory. In these districts also, the mean age at which females attain the minimum mortality, is the same as that for males; whilst in other districts, the minimum is generally attained one year earlier by females than by males. During the twenty years ending with 1830, for every 100 births of females, there were born of males, 110 in Wales, 108 in Devon, and 107 in Cornwall, whilst in the whole of England and Wales, the excess was only $4\frac{1}{2}$ per cent. In Middlesex and Surrey, the excess of male births was only $1\frac{1}{4}$ per cent.; but this affords no ground for inferring that the proportion of conceptions of males was less in London than in the country at large. The mortality in infancy is much greater in large towns than in the country; and it is very probable that the mortality of males before birth, exceeds the mortality of females before birth, according to the same law as exists for the first five years after birth. But in the case of Wales, Devon, and Cornwall, the mortality during the five years after birth, differs very little from the mortality in many counties where the excess

of male births is only half as great. We may hence justly conclude, that the mortality before birth differed very little, and, consequently, that the excess of male conceptions is considerably greater in Wales, Cornwall, and Devon, than in the rest of the territory.

The relative mortality of the male to the female sex, between the ages of fifteen and sixty years of age, appears to be dependent on the mean age at which the period of " infancy " terminates. In nearly all the counties, this period for males terminates at the age of eight years, which is indicated by the fact, that the mortality between five and ten is 50 per cent. greater than the mortality between ten and fifteen years of age. In the majority of counties, this period for females terminates at seven years, as is indicated by the fact, that the mortality at the former exceeds that at the latter interval only 20 per cent. Cornwall, Devon, Wales, and London, are the exceptions to this general rule, the mean terminating age for females being at eight years or above. In these four districts, the relative mortality of males to females is just the reverse of what exists in the rest of the observed territory. The general law appears to be, that when the minimum is attained by both sexes at the same age, the mortality of males exceeds that of females; and that when the minimum is attained half a year sooner by females than by males, the mortality of the two sexes between the ages of fifteen and sixty years of age is equal.

In adopting the mortality between the ages of fifteen and sixty years, as an index to the healthfulness of a locality, I have been influenced by political as well as numerical considerations. The strength of any nation resides in the individuals comprehended in this interval of age. A low degree of mortality at this interval contributes greatly to the physical, but more especially to the moral, strength of a nation. A low degree of mortality in infancy does not necessarily add to the strength of a nation, because it frequently involves a high mortality at the period when life is most valuable. Comparing together two " stationary " populations having each the same number living between fifteen and sixty years, the stronger and more healthy is that containing the smaller number of living under the age of fifteen years. If, however, it be assumed that the population

above the age of sixty years, is as much a source of weakness as the population under the age of fifteen, then the physical force of any given amount of population, is independent of the law of mortality ; at least the highest and the lowest laws of mortality which have been supposed to exist, yield the same proportion of living between the ages of fifteen and sixty years, out of a given number living at all ages. The highest law of mortality I suppose to be represented by the ancient tables for London and Stockholm ; the lowest law by Dr. Heysham's observations at Carlisle, on the supposition that there were no deficiencies in the registered deaths.

It is a remarkable fact, that all the counties of England in which the mortality of females between the ages of fifteen and thirty is at a maximum, are situated on or near the same straight line ; and that in the counties most distant from this line, the mortality is at a minimum, the maximum being to the minimum in the proportion of three to two nearly. This line is a central one running in a north-west direction from Brighton to Liverpool. In Northumberland and Cornwall, the two counties most distant from each other and from this line, the mortality is at the minimum. Sussex has been supposed to be one of the most healthy counties of England, and the mortality under the age of five years is as low in this as in any county. Nevertheless it obeys the law common to other counties on the central line, and suffers the maximum mortality between the ages of fifteen and thirty years. Possibly the apparent high salubrity of Cornwall, Devon, and Wales, may be the effect of their peculiar geological and geographical position. They are situated on primitive rocks containing no organic remains, and they are most exposed to the sea air.

In the preceding table the different counties have been classified, and the mortality has been stated for each county at five intervals of age. I now present a second table. which shows the mortality at six intervals of age, resulting from combining the counties comprehended in each of the eight classes. I also present the whole of the materials from which the mortality of those classes, or combinations of counties, has been deduced, in order that every reader may possess the means of verifying with ease the results exhibited. Any person possessing copies of the population returns of 1821 and 1831, may verify with equal facility the results exhibited for single counties. In the table for the separate counties, on account of the insufficient magnitude of the observations, the mortality between the ages of five and ten, was not distinguished from the mortality between ten and fifteen years of age, as it is in the following table.

Two Tables *of the Living and Dying at six intervals of Age.*

*Living on the 28th May, 1821.*

| Living between | | 0-5 | 5-10 | 10-15 | 15-30 | 30-60 | Above 60 | Ages specified | Total |
|---|---|---|---|---|---|---|---|---|---|
| Class 1 .. | M. | 50,453 | 43,490 | 37,563 | 78,323 | 85,473 | 24,932 | 320,234 | 333,046 |
| | F. | 48,983 | 43,141 | 35,668 | 91,860 | 98,550 | 31,190 | 349,392 | 363,441 |
| Class 2 .. | M. | 56,708 | 52,741 | 45,528 | 93,325 | 100,655 | 30,233 | 379,190 | 387,765 |
| | F. | 54,319 | 50,237 | 42,747 | 100,649 | 107,958 | 36,563 | 392,473 | 401,506 |
| Class 3 .. | M. | 94,191 | 83,353 | 74,464 | 154,263 | 170,005 | 51,573 | 627,849 | 730,303 |
| | F. | 90,733 | 81,638 | 69,395 | 175,342 | 188,439 | 58,458 | 664,005 | 785,842 |
| Class 4 .. | M. | 69,604 | 62,598 | 53,685 | 112,414 | 122,598 | 39,358 | 460,257 | 488,312 |
| | F. | 67,955 | 61,192 | 49,802 | 122,861 | 131,873 | 42,033 | 475,716 | 509,539 |
| Class 5 .. | M. | 116,395 | 100,271 | 86,769 | 181,348 | 197,896 | 52,670 | 735,349 | 817,363 |
| | F. | 112,420 | 98,379 | 82,649 | 198,245 | 200,302 | 54,863 | 746,858 | 837,745 |
| Class 6 .. | M. | 136,139 | 123,438 | 106,979 | 216,943 | 241,683 | 71,215 | 896,397 | 951,126 |
| | F. | 132,964 | 121,189 | 100,127 | 236,628 | 249,478 | 71,355 | 911,741 | 972,087 |
| Class 7 .. | M. | 189,437 | 163,331 | 142,554 | 286,126 | 312,659 | 77,508 | 1,171,615 | 1,402,807 |
| | F. | 183,833 | 160,371 | 134,207 | 326,250 | 322,259 | 80,332 | 1,207,252 | 1,454,804 |
| Class 8 .. | M. | 78,652 | 64,636 | 56,071 | 142,624 | 187,226 | 30,952 | 560,161 | 723,444 |
| | F. | 83,482 | 66,310 | 54,771 | 185,072 | 203,785 | 38,762 | 632,182 | 819,745 |
| Total .. | M. | 791,579 | 693,858 | 603,613 | 1,265,366 | 1,418,195 | 378,441 | 5,151,052 | 5,834,166 |
| | F. | 774,689 | 682,457 | 569,366 | 1,436,907 | 1,502,644 | 413,556 | 5,379,619 | 6,144,709 |

*Dying at specified Ages during the 18 years 1813-30.*

| Dying between | | 0-5 | 5-10 | 10-15 | 15-30 | 30-60 | Above 60 | Ages specified | Total registered, 20 yrs, 1811-30 |
|---|---|---|---|---|---|---|---|---|---|
| Class 1 | M | 35,450 | 4,606 | 2,416 | 10,638 | 20,420 | 31,710 | 105,240 | 117,401 |
| | F. | 29,944 | 4,576 | 2,468 | 10,705 | 19,534 | 37,342 | 104,569 | 116,797 |
| Class 2 | M. | 32,465 | 4,674 | 2,948 | 12,267 | 20,362 | 33,365 | 106,081 | 117,377 |
| | F. | 27,088 | 4,333 | 2,694 | 11,107 | 19,947 | 37,921 | 103,090 | 114,813 |
| Class 3 | M. | 73,704 | 9,902 | 6,206 | 23,981 | 44,408 | 69,608 | 227,809 | 252,544 |
| | F. | 61,984 | 9,240 | 6,249 | 27,817 | 48,536 | 77,688 | 231,514 | 258,425 |
| Class 4 | M. | 52,365 | 6,296 | 4,081 | 16,097 | 26,680 | 49,599 | 155,118 | 171,573 |
| | F. | 44,134 | 5,803 | 4,476 | 19,578 | 30,899 | 51,764 | 156,654 | 174,618 |
| Class 5 | M. | 108,043 | 12,723 | 8,071 | 28,659 | 49,623 | 69,790 | 276,909 | 312,502 |
| | F. | 90,531 | 11,174 | 7,638 | 32,305 | 52,254 | 71,612 | 265,514 | 301,186 |
| Class 6 | M. | 103,853 | 13,120 | 8,552 | 33,322 | 59,245 | 92,927 | 311,019 | 346,881 |
| | F. | 86,927 | 12,076 | 9,432 | 42,449 | 64,216 | 91,840 | 306,940 | 343,682 |
| Class 7 | M. | 216,756 | 23,982 | 14,867 | 56,560 | 97,757 | 110,884 | 520,806 | 599,125 |
| | F. | 184,396 | 21,486 | 14,055 | 63,131 | 100,126 | 113,022 | 496,216 | 572,256 |
| Class 8 | M. | 113,403 | 11,960 | 5,183 | 26,467 | 78,019 | 58,381 | 293,413 | 344,468 |
| | F. | 97,899 | 11,044 | 5,143 | 27,583 | 68,193 | 67,742 | 277,604 | 328,030 |
| Total | M. | 736,039 | 87,263 | 52,324 | 207,991 | 396,514 | 516,264 | 1,996,395 | 2,261,871 |
| | F. | 622,903 | 79,732 | 52,155 | 234,675 | 403,705 | 548,931 | 1,942,101 | *2,209,807 |

\* The total registered deaths of females in England and Wales during twenty years, exceeds this number by 576, which were deaths contained in returns received after the county summaries were completed. Mr. Rickman has omitted to give the means of distributing these omitted deaths according to their respective counties.

**TABLE,** *showing in each of Six Gradations of Age, the Mortality per cent. of each Sex in each of Eight Classes of English Counties.*

| Class. | Males (corrected).* | | | | | | | Females. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 | 5-10 | 10-15 | 15-30 | 30-60 | Above 60 | All Ages | 0-5 | 5-10 | 10-15 | 15-30 | 30-60 | Above 60 | All Ages |
| 1 | 4.19 | .63 | .38 | .75 | 1.36 | 7.58 | 1.90 | 3.65 | .63 | .41 | .70 | 1.18 | 7.14 | 1.78 |
| 2 | 3.87 | .60 | .44 | .83 | 1.31 | 7.46 | 1.83 | 3.39 | .59 | .43 | .75 | 1.26 | 7.06 | 1.79 |
| 3 | 4.14 | .63 | .44 | .76 | 1.32 | 7.15 | 1.86 | 3.58 | .59 | .47 | .83 | 1.35 | 6.96 | 1.83 |
| 4 | 4.36 | .58 | .44 | .80 | 1.23 | 7.30 | 1.92 | 3.76 | .55 | .52 | .92 | 1.35 | 7.12 | 1.90 |
| 5 | 5.24 | .72 | .52 | .86 | 1.38 | 7.47 | 2.09 | 4.52 | .64 | .52 | .92 | 1.47 | 7.33 | 2.00 |
| 6 | 4.45 | .62 | .47 | .87 | 1.40 | 7.62 | 1.99 | 3.81 | .58 | .55 | 1.05 | 1.50 | 7.51 | 1.96 |
| 7 | 6.11 | .78 | .56 | 1.03 | 1.64 | 7.64 | 2.34 | 5.33 | .71 | .56 | 1.03 | 1.65 | 7.48 | 2.50 |
| 8 | 8.19 | 1.05 | .53 | .95 | 2.27 | 10.72 | 2.88 | 6.68 | .95 | .53 | .85 | 1.91 | 9.95 | 2.18 |
| Total | 5.30 | .72 | .49 | .88 | 1.53 | 7.77 | 2.15 | 4.56 | .66 | .52 | .93 | 1.52 | 7.53 | 2.05 |
| Table of " Mean Mortality," when period of " Infancy " terminates at seven years. | | | | | | | | 4.47 | .77 | .65 | .86 | 1.66 | 7.62 | 2.09 |

\* The apparent mortality of the male sex between 15 and 30, between 30 and 60, and at all ages, has been diminished by .06 in the total, and in classes 1, 2, and 3; it has been diminished by .03 in classes 4, 5, 6, and 7; and by .10 in the eighth class.

In the above table the mortality at different ages is founded upon the deaths at specified ages occurring during the eighteen years 1813-30, whilst the absolute annual mortality is founded on the deaths occurring during the twenty years 1811-30. The difference between the mortality for the eighteen and for the twenty years is insignificant; in the former case, for the whole of England and Wales, it was for the female sex, 2.064 per cent. per annum; in the latter case it was 2.061. It would have served no useful purpose to have undertaken the labour of separating the deaths of the two years 1811 and 12, and the difficulty to the reader in verifying my results would have been unnecessarily increased. For similar reasons I have also omitted to complicate the question, by introducing a trifling correction consequent on the assumed mean population being too great, the enumeration having been made in the middle instead of at the beginning of the year 1821. It may be useful to give an example of the mode of obtaining the number representing the absolute annual quantity. In the first class, the registered deaths of females are stated to amount to 116,797, which increased one-ninth part for unregistered deaths, and divided by 20, yields 64,887, as the average annual deaths. This number divided by 363,441, representing the mean number living during the period of observation, gives the quotient 1.78, which is the number stated as representing the absolute annual mortality. The relative mortality at each age results from dividing the deaths at specified ages, by the living at the same specified ages. These numbers are then made to represent the absolute mortality at each interval of age, by using, as a common multiplier, the number which will reduce the mortality of the aggregate to the number previously obtained, representing the absolute annual mortality at all ages.

In the eight classes of counties, the ascending gradations in the mortality between the ages of fifteen and thirty years, are not so well marked among males as among females. Nevertheless the difference between the maximum and minimum is nearly the same for each sex. In the first, or most healthy class, the annual mortality of females between the ages of fifteen and thirty is seven out of one thousand living ; in the seventh, or most unhealthy class, it is 10.3 out of a thousand. In the same classes, at the same age, for males, the results are 7.5 and 10.3 out of one thousand living. On inspection of the above table it will be seen, that the mortality of females between the ages of fifteen and thirty most exceeds the mortality of males at the same age, when the mortality of females between five and ten differs least from the mortality of females between ten and fifteen years. From the same table it would appear that the mortality above the age of sixty years is nearly constant in all classes, especially among males. This result is not much to be relied upon, because the variations to be looked for are very small, and as such might be concealed by the population above the age of sixty years, not being exactly distributed in the same manner in the different counties. There exists, however, a distinct ground for the belief that the mortality above the age of sixty years is nearly con-

stant. In nearly all the counties of England the number living in 1821 between the ages of sixty and seventy was to the number living between the ages of seventy and eighty years, in the proportion of two to one nearly, which coincides with the result of the table of "Mean Mortality," on the assumption of the population being stationary. I have already stated my reasons for the belief that this was the case, and that the living between seventy and eighty were the survivors of the same number of births as the living between sixty and seventy years of age.

The population returns furnish the materials for determining the law of mortality in six towns only, which are of the largest size, and principally seaports. On account of the omission in the enumeration of the maritime and military population, we can-not determine the degree in which the mortality of males exceeds that of females between the ages of fifteen and sixty years. It is, however, indisputable that in all these towns the mortality of males considerably exceeds that of females at every age. In all England and Wales the mortality of males above the age of sixty years, exceeds that of females by three per cent. only; in the six large towns the excess is 14 per cent. The scale of relation connecting together the mortality at different ages in large towns differs from the scale for counties chiefly in exhibiting a high ratio of mortality in infancy and in old age; the mini-

mum mortality, or that existing between the ages of ten and fifteen years, being nearly the same in towns as in the country. The absolute mortality stated for these towns is founded on the assumption that the registered deaths are to be increased 20 per cent. in order to obtain the true number of deaths; in the whole of England and Wales the estimated increase has been 13.92 per cent. In large towns the mortality between five and ten, is to the mortality between ten and fifteen as two to one nearly, which indicates that the mean age of attaining the minimum mortality is at nine years; for all England and Wales the minimum is attained at the age of $7\frac{1}{4}$ years. This fact, which is established on the firmest ground, as it depends on the correctness of the relative and not of the absolute numbers returned, seems to contradict the commonly entertained opinion, that the epoch of puberty occurs at an earlier age in towns than in the country. It is, however, difficult to believe that such an opinion can have any sound foundation; for it can hardly be disputed that the general population of large towns suffer greater privations of food and air, than do the inhabitants of the country. Perhaps the erroneous opinion may have been founded on observations of the wealthier and smaller proportion of the inhabitants of towns who are accustomed to highly stimulating diet, and to a high temperature in their habitations.

TABLE, *showing in each of Six Gradations of Age, the Mortality per cent. of each Sex in each of Six Large Towns.*

| | Males (without correction). | | | | | | | Females. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 | 5-10 | 10-15 | 15-30 | 30-60 | Above 60 | All Ages | 0-5 | 5-10 | 10-15 | 15-30 | 30-60 | Above 60 | All Ages |
| York .... | 7.42 | 1.02 | .72 | 1.03 | 1.76 | 9.22 | 2.65 | 6.39 | .81 | .52 | 1.00 | 1.60 | 8.04 | 2.32 |
| Norwich .. | 9.81 | .95 | .47 | .81 | 1.60 | 8.96 | 2.98 | 7.68 | .73 | .50 | .78 | 1.50 | 7.80 | 2.51 |
| Plymouth | 8.90 | 1.05 | .60 | 2.02 | 2.46 | 9.00 | 3.60 | 7.56 | 1.05 | .53 | .91 | 1.62 | 7.79 | 2.52 |
| Hull ..... | 8.40 | 1.28 | .59 | 1.37 | 2.03 | 9.57 | 3.13 | 6.79 | .98 | .57 | .99 | 1.84 | 8.48 | 2.55 |
| Portsmouth | 7.66 | 1.02 | .60 | 1.89 | 2.49 | 10.48 | 3.35 | 6.25 | .84 | .49 | 1.15 | 1.99 | 8.69 | 2.49 |
| Liverpool | 10.31 | 1.13 | .67 | 1.73 | 2.71 | 10.64 | 3.65 | 9.89 | 1.10 | .54 | 1.10 | 2.11 | 9.58 | 2.97 |
| TotalTowns | 9.14 | 1.08 | .62 | 1.52 | 2.32 | 9.80 | 3.36 | 8.00 | .96 | .53 | 1.01 | 1.85 | 8.56 | 2.66 |

The mode of distribution according to the age of the population living in 1821 is a question of considerable importance in the present inquiry. I have therefore constructed a table representing the number of females living in each of five gradations of age, in each of the eight classes of counties, and in each of the six towns, out of one thousand living at all ages. This table indicates that the mode of distribution of the living is nearly the same in all classes except the eighth, which represents London.

The great disproportion in this last class between the numbers living between five and fifteen, and between fifteen and thirty years of age, shows that one-third of the females living in London between fifteen and thirty are immigrants from the surrounding country. It would be difficult to give a correct and useful view of the manner in which the male population is distributed, because we are ignorant of the number and ages of the military and maritime population attached to England, whether at

home or abroad. Mr. Rickman, in the population returns of 1821, has given a very incorrect view of the distribution of the male population. He omits entirely all the maritime and military population, and consequently exhibits an excessive proportion of males under fifteen and above sixty years of age.

In comparing together two districts wherein the population is stationary, the higher proportion of survivors above the age of sixty years, will indicate the existence of a lower degree of mortality. When the population of the two districts suffers the same rate of increase or decrease, the higher proportion of survivors will equally well indicate the lower degree of mortality. Upon a principle of this nature I have instituted a comparison in the different classes of counties, and in towns, between the number living above sixty, and the number living between thirty and sixty years of age. I have added a column in the following table to represent the proportion of survivors above sixty for every one hundred living between thirty and sixty. There is a general agreement between the mortality indi-

cated by this and by other principles. For example, the annual mortality of females in the first class above the age of sixty is 7.14, and in class eight it is 9.95 per cent. In the first class the living above sixty amount to 31.6 for every one hundred living between thirty and sixty; whilst in class eight the survivors amount to only nineteen out of a hundred. The few existing discrepancies are such as might be expected to arise from occasional differences in the rate of increase of the populations compared. I have also given the results of my table of "Mean Mortality," founded upon the assumption that the population had been increasing 16 per cent. at each decennial interval under the age of fifty years, and had been stationary above that age. It has also been assumed that the age at which the minimum mortality has been attained is seven years, which corresponds with the fact for females in all England. The resulting distribution according to this theoretical table agrees precisely with the ascertained distribution according to age of the female population of England in 1821.

TABLE, *showing for each of Eight Classes of Counties, and for each of six large Towns, the number of Females living in each of five intervals of Age out of* 1000 *living at all Ages; also showing the proportion living above* 60 *years of Age, for every hundred living between* 30 *and* 60 *years.*

| Counties. | Females in England and Wales. | | | | | | Towns. | Females in Towns, &c. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 | 5-15 | 15-30 | 30-60 | Above 60 | Prop. above 60 | | 0-5 | 5-15 | 15-30 | 30-60 | Above 60 | Prop. above 60 |
| Class 1 | 140 | 226 | 263 | 282 | 89 | 31.6 | York .... | 118 | 224 | 277 | 298 | 83 | 28.0 |
| 2 | 138 | 237 | 257 | 275 | 93 | 33.9 | Norwich ... | 124 | 199 | 277 | 303 | 97 | 31.9 |
| 3 | 137 | 227 | 264 | 284 | 88 | 31.0 | Plymouth .. | 138 | 210 | 261 | 321 | 70 | 21.7 |
| 4 | 143 | 233 | 259 | 277 | 88 | 31.9 | Hull ...... | 139 | 214 | 268 | 308 | 71 | 23.2 |
| 5 | 151 | 242 | 265 | 268 | 74 | 27.4 | Portsmouth | 148 | 232 | 266 | 295 | 59 | 19.9 |
| 6 | 146 | 243 | 259 | 274 | 78 | 28.6 | Liverpool .. | 135 | 232 | 278 | 303 | 52 | 17.2 |
| 7 | 152 | 244 | 270 | 267 | 67 | 24.9 | Total Towns | 135 | 221 | 272 | 305 | 67 | 21.8 |
| 8 | 132 | 192 | 293 | 322 | 61 | 19.0 | Scotland .. | 129 | 223 | 282 | 286 | 80 | 28.0 |
| England & Wales | 144 | 233 | 267 | 279 | 77 | 27.5 | Ireland } M.F. | 153 | 257 | 298 | 252 | 40 | 15.7 |
| Mean Mortality .. | 144 | 230 | 262 | 288 | 76 | 26.5 | Belgium } M.F. | 130 | 204 | 256 | 315 | 95 | 30.3 |

The greatly diminished mortality of infants in England is probably the consequence of the rapid increase of the population during the last sixty years. There are only two principal causes which operate in producing an increase of population; and either of these would appear adequate to account for a diminished mortality in infancy, and an increased mortality between fifteen and sixty years of age. The first cause is an increased supply of food to each

living individual; of which the immediate and temporary effect is, a reduction in the mortality at every age. The second cause which determines an increase of population is, the exercise, at an earlier period, of the reproductive power, which is the only way that an increase of population can be obtained when the proportion of food to each individual remains constant. I believe that the fact will not be disputed, that the development of animate and inanimate life is

accelerated by a plentiful supply of food; and I believe that it will no more be disputed, that as the rapidity of development increases, the soundness and degree of consolidation of the mature individual diminishes. Whether a diminution of the mean age of contracting marriages causes a more rapid development of the new population, is more a matter of conjecture, as the facts bearing on the subject are yet very deficient. It appears, however, highly probable that the children of parents who have exercised the power of reproduction at an early age, will be sooner able to propagate than the children of those who have exercised this power at a more advanced age. The germs of animals may reasonably be supposed to obey laws similar to those regulating other constituent parts of adult individuals. I believe it to be admitted by physiologists, that the proportion of new matter secreted, and of old matter absorbed, diminishes as the age of the adult individual increases. That is to say, the elements of the members of young individuals are in a state of greater activity, or impressed with more motion, than those of older individuals. It may hence be inferred that the germs detached at an early age, containing elements in a higher state of activity, will have a tendency to more rapid development than the germs detached from the same individual at a more advanced age.

The English population returns, however, supply no evidence as to the epoch of puberty; they only show that the minimum mortality is now attained one or two years earlier than it is supposed to have been attained in any other European country. This is, however, a sufficient ground for presuming that the new population undergoes a more rapid development than that undergone by the population of other countries; which presumption is corroborated by a corresponding increase in the mortality between fifteen and sixty years of age. In every county of England, the mortality between the ages of fifteen and thirty years bears a higher proportion to the mortality between thirty and sixty years of age than it ought to do according to the Swedish observations, or according to the new theory of mortality. This apparent contradiction becomes a confirmation of the new theory, if it be admitted that the English population is now in a state of transition, and that the limiting age of " infancy" fifty years ago was at nine years instead of at seven and a half

years, which it is at present. It being also admitted that the contraction of the period of infancy indicates a more rapid development, and a consequent diminution of consolidation in the new population. The deviation from the theory in England now is just what might be expected to occur, on the supposition of the rising adult population possessing a lower degree of vitality than their immediate predecessors.

The population of Belgium is apparently also in a state of transition from a low to a high mortality between the ages of fifteen and sixty years. The limiting age of infancy is now at eight and a quarter years, having previously been probably at nine years, as in other European countries. The Belgic observations exhibit the same " plague spot" as the English observations, in the high relative mortality between the ages of twenty and thirty years. The only difference between the population of the two countries appears to be, that the state of transition has endured twenty years longer in England than in Belgium. It is not improbable that the law of mortality in Belgium, at the present day, coincides with the law of mortality which existed in England twenty years ago. Under the age of ten years the mortality in England is considerably less than in Belgium; at all ages above fifteen years it is as much greater.

It might be denied that the proportion of food to each individual of the English population has been increased during the last sixty years, because the wages of labour, measured in wheat, has not been increased during that period. This objection is of no weight, because the mode of subsistence of the labouring population has experienced a great change, potatoes having constituted one of the principal articles of diet. Assuming that four pounds of potatoes are equivalent in nourishing power to one pound of wheat, and that six pounds of potatoes are generally sold for the same price as one pound of wheat, each labourer will have his command of food increased fifty per cent. In London, and probably in all very large towns, one pound of wheat is seldom exchangeable for more than three pounds of potatoes; consequently the labourer can obtain no increase of nourishment by expending his wages on potatoes instead of on wheat, and cannot satisfy his hunger with coarse food when the supply of plain food fails him. In small towns, but more especially in villages, a great increase of food is generally obtained by the substitution of potatoes for wheat. This difference in the relative value of wheat and potatoes, by causing a different degree of privation, may be the reason why the minimum mortality is attained one year later in large towns than in the country.

46, Regent-square, Dec. 1835.