

**DATA OF TWIN BIRTHS OCCURRING  
IN 2 ENGLISH METROPOLITAN HOSPITALS**

by  
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This paper presents an analysis of the records of 583 twin births in two English hospitals over the period 1927-46 approximately.

No information is given as to zygosity, so the only classification which can be made is that of like sex (monozygotic and dizygotic pairs), and unlike sex (dizygotic only).

These groups are divided as

|     |     |    |     |                  |
|-----|-----|----|-----|------------------|
| MM  | MF  | FM | FF  | Total twin pairs |
| 200 | 110 | 92 | 181 | 583              |

giving 381 like sex pairs, and 202 unlike sex pairs.

Information is given, in most cases, as to birth weight, gestation time in days or weeks, age of mother, order of birth or parity, stillbirths and survival to 28 days; but in some cases these details are incomplete.

**Table 1 - Distributions of mother's age, with means and standard deviations  
(Data from two English hospitals)**

| Sex Group | Mother's age |     |     |     |     |     |     | Total | Mean (yr.) | s. d. (yr.) |
|-----------|--------------|-----|-----|-----|-----|-----|-----|-------|------------|-------------|
|           | Under 20     | 20— | 25— | 30— | 35— | 40— | 45— |       |            |             |
| Like      | 6            | 54  | 85  | 76  | 59  | 26  | 1   | 307   | 30.42      | 6.36        |
| Unlike    | 2            | 23  | 50  | 60  | 25  | 8   | —   | 168   | 30.18      | 5.38        |

**Table 2 - Distributions of order of birth, with means and standard deviations  
(Data from 2 English hospitals)**

| Sex Group | Order of birth |    |    |    |    |    |    |   |   |    |    |    |    |    |    | Total | Mean | s. d. |
|-----------|----------------|----|----|----|----|----|----|---|---|----|----|----|----|----|----|-------|------|-------|
|           | 1              | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |       |      |       |
| Like      | 114            | 51 | 40 | 20 | 24 | 15 | 11 | 9 | 7 | 7  | 6  | 1  | 1  | —  | 1  | 307   | 3.30 | 2.82  |
| Unlike    | 61             | 33 | 22 | 15 | 9  | 7  | 7  | 8 | 2 | —  | 3  | —  | —  | —  | 1  | 168   | 3.09 | 2.57  |

Table 3 - Distributions of birth weight, with means and standard deviations, males and females of like and unlike sex groups  
(Data of two English hospitals)

| Sex Group | Sex    | Weight (lb.) (g.) |             |              |              |              |              |              |              |              | Totals | Mean lb. g.                | s. d.<br>lb. g. |
|-----------|--------|-------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|----------------------------|-----------------|
|           |        | 1½—<br>227—       | 1½—<br>680— | 2½—<br>1134— | 3½—<br>1587— | 4½—<br>2041— | 5½—<br>2494— | 6½—<br>2948— | 7½—<br>3401— | 8½—<br>3855— |        |                            |                 |
| Like      | Male   | 3                 | 24          | 24           | 49           | 118          | 94           | 64           | 13           | 1            | 390    | 5.208 ± 0.076<br>2362 ± 34 | 1.49;<br>679    |
|           | Female | 4                 | 13          | 35           | 45           | 103          | 98           | 44           | 8            | 1            | 351    | 5.118 ± 0.077<br>2321 ± 35 | 1.435<br>651    |
|           | Both   | 7                 | 37          | 59           | 94           | 221          | 192          | 108          | 21           | 2            | 741    | 5.165 ± 0.054<br>2342 ± 24 | 1.468<br>666    |
| Unlike    | Male   | 1                 | 4           | 9            | 22           | 47           | 67           | 33           | 9            | 3            | 195    | 5.587 ± 0.099<br>2534 ± 45 | 1.376<br>624    |
|           | Female | 1                 | 8           | 14           | 23           | 58           | 65           | 21           | 9            | 2            | 201    | 5.306 ± 0.101<br>2406 ± 46 | 1.427<br>647    |
|           | Both   | 2                 | 12          | 23           | 45           | 105          | 132          | 54           | 18           | 5            | 396    | 5.444 ± 0.071<br>2469 ± 32 | 1.409<br>639    |

Diff. unlike — like = 0.279 ± 0.089 lb.  
= 127 ± 40 g.

Table 4 - Distributions of gestation time, with means and standard deviations

| Sex Group | Gestation time (days) |      |      |      |      |      |      |      |      |      |      |      |      | Total | Mean (days) | s. d. (days) |       |
|-----------|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------------|--------------|-------|
|           | 155—                  | 170— | 185— | 200— | 215— | 230— | 245— | 260— | 275— | 290— | 305— | 320— | 335— |       |             |              | 350—  |
| Like      | —                     | 12   | 4    | 19   | 35   | 61   | 109  | 189  | 137  | 20   | 10   | —    | 1    | 1     | 598         | 259.83       | 24.04 |
| Unlike    | 2                     | —    | 2    | 8    | 14   | 26   | 78   | 84   | 106  | 6    | 2    | —    | —    | —     | 328         | 262.24       | 20.11 |

In the compilation of the distributions of the variables, and of the correlations between them, taken two together, the totals vary, but all those available are used, and the numbers are as complete as possible.

Since this is a sample of hospital deliveries rather than of the general population the distributions of mother's age and order of birth differ from those of the whole population (Stocks, 1952). The distributions of the present data are set out in Tables 1, 2, showing the means and standard deviations.

The distributions of birth weight are given in Table 3 for the two groups, and show some definite differences. The mode for like sex is in the weight group  $4\frac{1}{2}$  to  $5\frac{1}{2}$  lbs., (2041-2494 g.) that for the unlike sex is in the higher group  $5\frac{1}{2}$  to  $6\frac{1}{2}$  lbs. (2494-2948 g.). The mean weights are, respectively, 5.165 lb. (2342 g.) and 5.444 lb. (2469 g.), with a significant difference of 0.279 lb. (127 g.).

The means for male and female are shown separately in each group; the males are higher, as usual, and both the males and the females are higher in the unlike sex group. The females of this group are actually heavier than the males of the like sex group.

If the data could have been divided into monozygotic and dizygotic groups the mean weight for the monozygotic pairs alone would be smaller still; thus the dizygotic have an initial advantage in weight compared with the monozygotic. This has also been observed by Essen-Möller (Gedda, 1951).

In gestation time (Table 4) the mode for the like sex group falls into the period 260-274 days; in the unlike sex group, on the other hand, it is in the later period 275-289 days which is the modal period also for single births. The means are, for like and unlike sex respectively, 259.8 and 262.2 days.

Tables 5 (a), (b) show also, for given weight of one twin, the distributions of weight for the other twin. The corresponding mean weights are set out in Table 5 (c) for like sex and unlike sex groups.

The correlations are higher than those found for pairs of successive siblings (Karn et al. 1951) and are as high as those for closely related anthropometric measurements on the same individual, such as height and weight of adolescents.

The values are: 0.7265 for like sex  
and 0.6756 for unlike sex.

The results agree with findings noted by Gedda (1951) that monozygotic twins are more highly correlated in weight than are dizygotic.

The correlations between weight and each of the variables gestation time and order of birth are obtained from Tables 6, 7 in which there are two entries for weight for one of the other variables; thus the correlations need correction for the weight correlations of the twins. They can be taken as partial correlations, for example, gestation and weight of one twin, with weight of other twin constant.

The partial correlations are then,

|                                   |                   |                     |
|-----------------------------------|-------------------|---------------------|
| between gestation and weight      | 0.3451 (like sex) | 0.4030 (unlike sex) |
| between order of birth and weight | 0.1223            | » 0.0930            |
| between mother' age and weight    | 0.0886            | » 0.0773            |

These values agree closely with those found for single births (Karn and Penrose 1951),

Table 5 (a) - Weights of twins. LIKE SEX (Data of two English hospitals)

|                      | lb.              | Weight of one twin (lb.) (g.) |                          |                           |                           |                           |                           |                           |                           |                           | Totals | g.     |
|----------------------|------------------|-------------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------|--------|
|                      |                  | $\frac{1}{2}$ —<br>227—       | $1\frac{1}{2}$ —<br>680— | $2\frac{1}{2}$ —<br>1134— | $3\frac{1}{2}$ —<br>1587— | $4\frac{1}{2}$ —<br>2041— | $5\frac{1}{2}$ —<br>2494— | $6\frac{1}{2}$ —<br>2948— | $7\frac{1}{2}$ —<br>3401— | $8\frac{1}{2}$ —<br>3855— |        |        |
| Weight of other twin | $8\frac{1}{2}$ — | —                             | —                        | —                         | —                         | —                         | —                         | 2                         | —                         | —                         | 2      | 3855—  |
|                      | $7\frac{1}{2}$ — | 1                             | —                        | —                         | —                         | 2                         | 3                         | 11                        | 4                         | —                         | 21     | 3401—  |
|                      | $6\frac{1}{2}$ — | —                             | —                        | —                         | —                         | 13                        | 33                        | 48                        | 11                        | 2                         | 107    | 2948—  |
|                      | $5\frac{1}{2}$ — | —                             | —                        | —                         | 14                        | 61                        | 80                        | 33                        | 3                         | —                         | 191    | 2494—  |
|                      | $4\frac{1}{2}$ — | —                             | 4                        | 4                         | 33                        | 98                        | 61                        | 13                        | 2                         | —                         | 215    | 2041—  |
|                      | $3\frac{1}{2}$ — | —                             | 4                        | 15                        | 24                        | 33                        | 14                        | —                         | —                         | —                         | 90     | 1587—  |
|                      | $2\frac{1}{2}$ — | —                             | 13                       | 26                        | 15                        | 4                         | —                         | —                         | —                         | —                         | 58     | 1134—  |
|                      | $1\frac{1}{2}$ — | 4                             | 12                       | 13                        | 4                         | 4                         | —                         | —                         | —                         | —                         | 37     | 860—   |
| $\frac{1}{2}$ —      | 2                | 4                             | —                        | —                         | —                         | —                         | —                         | 1                         | —                         | 7                         | 227—   |        |
| Totals               |                  | 7                             | 37                       | 58                        | 90                        | 215                       | 191                       | 107                       | 21                        | 2                         | 728    | Totals |

$$r = 0.73$$

Table 5 (b) - Weights of twins. UNLIKE SEX (Data of two English hospitals)

|                       | lb.              | Weight of male twin (lb.) (g.) |                          |                           |                           |                           |                           |                           |                           |                           | Totals | g.     |
|-----------------------|------------------|--------------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------|--------|
|                       |                  | $\frac{1}{2}$ —<br>227—        | $1\frac{1}{2}$ —<br>680— | $2\frac{1}{2}$ —<br>1134— | $3\frac{1}{2}$ —<br>1587— | $4\frac{1}{2}$ —<br>2041— | $5\frac{1}{2}$ —<br>2494— | $6\frac{1}{2}$ —<br>2948— | $7\frac{1}{2}$ —<br>3401— | $8\frac{1}{2}$ —<br>3855— |        |        |
| Weight of female twin | $8\frac{1}{2}$ — | —                              | —                        | —                         | —                         | —                         | —                         | 1                         | —                         | —                         | 1      | 3855—  |
|                       | $7\frac{1}{2}$ — | —                              | —                        | —                         | —                         | —                         | 3                         | 2                         | 3                         | 1                         | 9      | 3401—  |
|                       | $6\frac{1}{2}$ — | —                              | 1                        | —                         | —                         | 3                         | 6                         | 6                         | 2                         | 2                         | 20     | 2948—  |
|                       | $5\frac{1}{2}$ — | —                              | —                        | —                         | 2                         | 12                        | 31                        | 13                        | 3                         | —                         | 61     | 2494—  |
|                       | $4\frac{1}{2}$ — | —                              | —                        | —                         | 6                         | 20                        | 23                        | 8                         | 1                         | —                         | 58     | 2041—  |
|                       | $3\frac{1}{2}$ — | —                              | —                        | —                         | 5                         | 12                        | 4                         | 2                         | —                         | —                         | 23     | 1587—  |
|                       | $2\frac{1}{2}$ — | —                              | —                        | 6                         | 7                         | —                         | —                         | 1                         | —                         | —                         | 14     | 1134—  |
|                       | $1\frac{1}{2}$ — | —                              | 3                        | 3                         | 2                         | —                         | —                         | —                         | —                         | —                         | 8      | 860—   |
| $\frac{1}{2}$ —       | 1                | —                              | —                        | —                         | —                         | —                         | —                         | —                         | —                         | 1                         | 227—   |        |
| Totals                |                  | 1                              | 4                        | 9                         | 22                        | 47                        | 67                        | 33                        | 9                         | 3                         | 195    | Totals |

$$r = 0.68$$

Table 5 (c) - For given birth weight of one twin, mean birth weight of other

| Like sex Group           |           |                            |      | Unlike sex Group          |           |                             |      |
|--------------------------|-----------|----------------------------|------|---------------------------|-----------|-----------------------------|------|
| Birth weight of one twin |           | Mean birth weight of other |      | Birth weight of male twin |           | Mean birth weight of female |      |
| lbs.                     | g.        | lbs.                       | g.   | lbs.                      | g.        | lbs.                        | g.   |
| 1/2—                     | 227—      | 2.74                       | 1243 | 1/2—                      | 227—      | 2.79                        | 1265 |
| 2 1/2—                   | 1134—     | 3.15                       | 1429 | 2 1/2—                    | 1134—     | 2.66                        | 1206 |
| 3 1/2—                   | 1587—     | 4.42                       | 2004 | 3 1/2—                    | 1587—     | 3.95                        | 1791 |
| 4 1/2—                   | 2041—     | 5.18                       | 2349 | 4 1/2—                    | 2041—     | 5.12                        | 2322 |
| 5 1/2—                   | 2494—     | 5.73                       | 2599 | 5 1/2—                    | 2494—     | 5.71                        | 2589 |
| 6 1/2—                   | 2948—     | 6.57                       | 2979 | 6 1/2—                    | 2948—     | 5.93                        | 2689 |
| 7 1/2—9 1/2              | 3401—4308 | 6.60                       | 2993 | 7 1/2—9 1/2               | 3401—4308 | 6.81                        | 3088 |

Table 6 (a) Gestation time and weight. LIKE SEX (Data of two English hospitals)

| Gestation time Days. | Wt. (lbs.)   |                |                 |                 |                 |                 |                 |                 |                 | Totals |
|----------------------|--------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|
|                      | 1/2—<br>227— | 1 1/2—<br>680— | 2 1/2—<br>1134— | 3 1/2—<br>1587— | 4 1/2—<br>2041— | 5 1/2—<br>2494— | 6 1/2—<br>2948— | 7 1/2—<br>3401— | 8 1/2—<br>3855— |        |
| 350—                 | —            | —              | —               | —               | —               | 1               | —               | —               | —               | 1      |
| 335—                 | —            | —              | —               | 1               | —               | —               | —               | —               | —               | 1      |
| 320—                 | —            | —              | —               | —               | —               | —               | —               | —               | —               | —      |
| 305—                 | —            | —              | —               | —               | 1               | 4               | 5               | —               | —               | 10     |
| 290—                 | —            | —              | —               | 1               | 8               | 5               | 6               | —               | —               | 20     |
| 275—                 | 1            | —              | —               | 9               | 39              | 43              | 33              | 12              | —               | 137    |
| 260—                 | —            | 2              | 4               | 14              | 62              | 65              | 35              | 6               | 1               | 189    |
| 245—                 | —            | 4              | 5               | 12              | 44              | 35              | 8               | 1               | —               | 109    |
| 230—                 | —            | 3              | 8               | 13              | 32              | 5               | —               | —               | —               | 61     |
| 215—                 | —            | 6              | 9               | 15              | 3               | —               | 2               | —               | —               | 35     |
| 200—                 | 1            | 8              | 10              | —               | —               | —               | —               | —               | —               | 19     |
| 185—                 | 1            | 2              | 1               | —               | —               | —               | —               | —               | —               | 4      |
| 170—                 | 3            | 3              | 6               | —               | —               | —               | —               | —               | —               | 12     |
| Totals               | 6            | 28             | 43              | 65              | 189             | 158             | 89              | 19              | 1               | 598    |

r (corrected for twin wt.) = .35

Table 6 (b) - Gestation time and weight. UNLIKE SEX

| Gestation time Days | Wt. (lbs.) (g.) |                |                 |                 |                 |                 |                 |                 |                 | Totals |
|---------------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|
|                     | 1/2—<br>227—    | 1 1/2—<br>680— | 2 1/2—<br>1134— | 3 1/2—<br>1587— | 4 1/2—<br>2041— | 5 1/2—<br>2494— | 6 1/2—<br>2948— | 7 1/2—<br>3401— | 8 1/2—<br>3855— |        |
| 305—                | —               | —              | —               | —               | 1               | 1               | —               | —               | —               | 2      |
| 290—                | —               | —              | —               | —               | 2               | 3               | —               | 1               | —               | 6      |
| 275—                | —               | 1              | —               | 6               | 18              | 39              | 29              | 8               | 5               | 106    |
| 260—                | —               | 1              | 1               | 4               | 23              | 41              | 11              | 3               | —               | 84     |
| 245—                | —               | 1              | 5               | 13              | 26              | 24              | 6               | 3               | —               | 78     |
| 230—                | —               | 2              | 5               | 6               | 11              | 1               | 1               | —               | —               | 26     |
| 215—                | —               | —              | 7               | 7               | —               | —               | —               | —               | —               | 14     |
| 200—                | —               | 5              | 3               | —               | —               | —               | —               | —               | —               | 8      |
| 185—                | —               | —              | 1               | 1               | —               | —               | —               | —               | —               | 2      |
| 170—                | —               | —              | —               | —               | —               | —               | —               | —               | —               | —      |
| 155—                | 2               | —              | —               | —               | —               | —               | —               | —               | —               | 2      |
| Totals              | 2               | 10             | 22              | 37              | 81              | 109             | 47              | 15              | 5               | 328    |

r (corrected for twin wt.) = .40

Table 6 (c) - Mean birth weight for given days of gestation LIKE and UNLIKE SEX

| Like sex              |                   |      | Unlike sex            |                   |      |
|-----------------------|-------------------|------|-----------------------|-------------------|------|
| Gestation time (days) | Mean birth weight |      | Gestation time (Days) | Mean birth weight |      |
|                       | lb.               | g.   |                       | lb.               | g.   |
| —                     | —                 | —    | 155—                  | 2.24              | 1016 |
| 170—                  | 2.18              | 987  | —                     | —                 | —    |
| 200—                  | 2.47              | 1120 | 200—                  | 2.37              | 1075 |
| 215—                  | 3.65              | 1655 | 215—                  | 3.49              | 1583 |
| 230—                  | 4.45              | 2018 | 230—                  | 4.26              | 1932 |
| 245—                  | 5.18              | 2349 | 245—                  | 5.24              | 2376 |
| 260—                  | 5.67              | 2571 | 260—                  | 5.74              | 2603 |
| 275—                  | 5.96              | 2703 | 275—                  | 6.24              | 2830 |
| 290—                  | 5.79              | 2626 | 290-320               | 5.87              | 2662 |
| 305-365               | 6.16              | 2794 | —                     | —                 | —    |

Table 7 (a) - Weight and order of birth. LIKE SEX (Data of two English hospitals)

| Weight |        | Order of birth |    |    |    |    |    |    |    |    |    |    |    |    |    |    | Totals |
|--------|--------|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------|
| (g.)   | (lbs.) | 1              | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |        |
| 3855—  | 8 ½—   | —              | —  | —  | —  | 1  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 1      |
| 3401—  | 7 ½—   | 4              | 2  | 3  | 3  | 1  | 2  | 3  | —  | —  | —  | 1  | —  | —  | —  | —  | 19     |
| 2948—  | 6 ½—   | 19             | 12 | 13 | 9  | 8  | 5  | 7  | 4  | 5  | 2  | 2  | 1  | 2  | —  | —  | 89     |
| 2494—  | 5 ½—   | 43             | 27 | 23 | 15 | 9  | 9  | 5  | 11 | 4  | 4  | 4  | 1  | —  | —  | —  | 155    |
| 2041—  | 4 ½—   | 70             | 34 | 27 | 8  | 17 | 8  | 6  | 3  | 2  | 4  | 5  | —  | —  | —  | 2  | 186    |
| 1587—  | 3 ½—   | 35             | 6  | 5  | 2  | 10 | 2  | 1  | —  | —  | 1  | —  | —  | —  | —  | —  | 62     |
| 1134—  | 2 ½—   | 23             | 10 | 4  | 3  | —  | 2  | —  | —  | 1  | —  | —  | —  | —  | —  | —  | 43     |
| 680—   | 1 ½—   | 20             | 4  | 2  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 26     |
| 227—   | ½—     | 6              | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 6      |
| Totals |        | 220            | 95 | 77 | 40 | 46 | 28 | 22 | 18 | 12 | 11 | 12 | 2  | 2  | —  | 2  | 587    |

$r = .2941$   $r$  (corrected for wt.) = .1223

Table 7 (b) - Weight and order of birth. UNLIKE SEX (Data of two English hospitals)

| Weight |        | Order of birth |    |    |    |    |    |    |    |   |    |    |    |    |    |    | Totals |
|--------|--------|----------------|----|----|----|----|----|----|----|---|----|----|----|----|----|----|--------|
| (g.)   | (lbs.) | 1              | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 | 11 | 12 | 13 | 14 | 15 |        |
| 3855—  | 8 ½—   | 1              | 1  | 1  | —  | —  | —  | —  | 1  | — | —  | 1  | —  | —  | —  | —  | 5      |
| 3401—  | 7 ½—   | 7              | 1  | —  | 2  | 3  | —  | —  | 1  | — | —  | —  | —  | —  | —  | —  | 14     |
| 2948—  | 6 ½—   | 10             | 8  | 7  | 4  | 1  | 5  | 3  | 6  | — | —  | 2  | —  | —  | —  | 1  | 47     |
| 2494—  | 5 ½—   | 37             | 16 | 17 | 15 | 7  | 7  | 2  | 3  | 3 | —  | 1  | —  | —  | —  | 1  | 109    |
| 2041—  | 4 ½—   | 28             | 24 | 10 | 6  | 3  | 2  | 4  | 2  | — | —  | 2  | —  | —  | —  | —  | 81     |
| 1587—  | 3 ½—   | 21             | 8  | 3  | 2  | 1  | —  | 1  | —  | 1 | —  | —  | —  | —  | —  | —  | 37     |
| 1134—  | 2 ½—   | 11             | 6  | 3  | —  | —  | —  | 2  | —  | — | —  | —  | —  | —  | —  | —  | 22     |
| 680—   | 1 ½—   | 4              | 1  | —  | —  | 3  | —  | 2  | —  | — | —  | —  | —  | —  | —  | —  | 10     |
| 227—   | ½—     | 2              | —  | —  | —  | —  | —  | —  | —  | — | —  | —  | —  | —  | —  | —  | 2      |
| Totals |        | 121            | 65 | 41 | 29 | 18 | 14 | 14 | 13 | 4 | —  | 6  | —  | —  | —  | 2  | 327    |

$r = .2068$   $r$  (corrected for wt.) = .0930

where weight has been shown to increase with order of birth until the late pregnancies when it begins to decrease. Mother's age, apart from order of birth, seemsto have no effect on weight.

Mean birth weight for given gestation time is shown in Table 6 (c) and Table 7 (c) and shows the increase in weight for order of birth found in twins as in single births.

Table 7 (c)

| Order of birth | Mean Birth weight |      |            |      |
|----------------|-------------------|------|------------|------|
|                | Like sex          |      | Unlike sex |      |
|                | lb.               | g.   | lb.        | g.   |
| 1              | 4.66              | 2113 | 5.15       | 2336 |
| 2              | 5.19              | 2354 | 5.24       | 2376 |
| 3              | 5.50              | 2494 | 5.63       | 2553 |
| 4              | 5.84              | 2649 | 5.92       | 2685 |
| 5              | 5.47              | 2481 | 5.44       | 2467 |
| 6              | 5.67              | 2571 | 6.21       | 2816 |
| 7 to 15        | 6.02              | 2730 | 5.84       | 2648 |

The neonatal deaths and stillbirths are noted in the records and the corresponding weights have been given where possible. Tables 8 (a), (b) give the distributions of weights of the twins when (1) both are survivors (2) one is a survivor and one is not (3) both are non-survivors. The percentage rates of mortality are shown in the last columns for groups of like and unlike sex. These follow much the same trend, being very high for the lowest weight group, and reducing to a minimum as weight increases.

Comparable rates for single births are shown in Table 8 (c) calculated from the data of a previous paper (Karn and Penrose, 1951).

The mortality rate is high in twins (16.6% for all twins) compared with that for single births (4.5%); but if the weight groups are examined and a comparison made between the rates in the successive groups, some instructive differences are revealed. Thus, the rates in the lowest group, under 1½ lb. (or 680 g.), are high and are the same for all infants. The rates in the next three groups are still high, but are higher in single births than in twins, and diminish to 25% and 20% in the twin groups and to 35% in the single births.

In the groups round and above the average weights 4½ lbs. (2041 g.) and above, for twins the rates diminish to about 7%, but are about three times the single rate. The rates for the heavy weight twins remain at this level and do not increase as those for single births do for the excessive weights 11½ lbs. (5215 g.) and over.



Table 8 - Distributions of birth weight in different survival groups. Like and unlike sex  
(Two English hospitals)

a) LIKE SEX

| Weight |       | Both survivors | One survivor | One non-survivor | Both non-survivors | Totals | Deaths | Mortality rate % |
|--------|-------|----------------|--------------|------------------|--------------------|--------|--------|------------------|
| lb.    | g.    |                | Survivor     | Non-Survivor     |                    |        |        |                  |
| 8 ½—   | 3855— | 2              | —            | —                | —                  | 2      | —      | 4.3              |
| 7 ½—   | 3401— | 17             | 3            | —                | 1                  | 21     | 1      |                  |
| 6 ½—   | 2948— | 95             | 6            | 4                | 3                  | 108    | 7      | 6.5              |
| 5 ½—   | 2494— | 168            | 10           | 8                | 6                  | 192    | 14     | 7.3              |
| 4 ½—   | 2041— | 189            | 18           | 5                | 10                 | 222    | 15     | 6.8              |
| 3 ½—   | 1587— | 64             | 6            | 12               | 12                 | 94     | 24     | 25.5             |
| 2 ½—   | 1134— | 20             | 7            | 9                | 23                 | 59     | 32     | 54.2             |
| 1 ½—   | 680—  | 4              | 1            | 3                | 29                 | 37     | 32     | 86.5             |
| ½—     | 227—  | —              | —            | 1                | 6                  | 7      | 7      | 100.0            |
| All    |       |                |              |                  |                    |        |        | 17.8 ±1.4        |

b) UNLIKE SEX

| Weight |       | Both survivors | One survivor | One non-survivor | Both non-survivors | Totals | Deaths | Mortality rate % |
|--------|-------|----------------|--------------|------------------|--------------------|--------|--------|------------------|
| lb.    | g.    |                | Survivor     | Non-Survivor     |                    |        |        |                  |
| 8 ½—   | 3855— | 4              | 1            | —                | —                  | 5      | —      | 4.3              |
| 7 ½—   | 3401— | 17             | —            | —                | 1                  | 18     | 1      |                  |
| 6 ½—   | 2948— | 48             | 4            | 2                | —                  | 54     | 2      | 3.7              |
| 5 ½—   | 2494— | 113            | 10           | 4                | 5                  | 132    | 9      | 6.8              |
| 4 ½—   | 2041— | 87             | 6            | 7                | 5                  | 105    | 12     | 11.4             |
| 3 ½—   | 1587— | 33             | 3            | 3                | 6                  | 45     | 9      | 20.0             |
| 2 ½—   | 1134— | 11             | 1            | 1                | 10                 | 23     | 11     | 47.8             |
| 1 ½—   | 680—  | 1              | —            | 2                | 9                  | 12     | 11     | 91.7             |
| ½—     | 227—  | —              | —            | —                | 2                  | 2      | 2      | 100.0            |
| All    |       |                |              |                  |                    |        |        | 14.4 ±1.8        |

The best survival in twins is in the groups of over average weight as in the single birth data.

There is a little advantage in survival rate in the unlike sex group as has been noted previously (Gedda, 1951).

Table 8 (c) - Mortality rate % for given birth weight  
SINGLE BIRTHS

| Weight lb. | Mortality rate % | Weight g. |
|------------|------------------|-----------|
| 11 ½—      | 25.0             | 5215—     |
| 10 ½—      | 8.3              | 4762—     |
| 9 ½—       | 4.7              | 4308—     |
| 8 ½—       | 2.9              | 3855—     |
| 7 ½—       | 1.8              | 3401—     |
| 6 ½—       | 2.3              | 2948—     |
| 5 ½—       | 3.5              | 2494—     |
| 4 ½—       | 11.8             | 2041—     |
| 3 ½—       | 35.1             | 1587—     |
| 2 ½—       | 73.5             | 1134—     |
| 1 ½—       | 96.7             | 680—      |
| ½—         | 100.0            | 227—      |
| All        | 4.5              | All       |

### Summary

A sample of 583 twins, delivered in two English hospitals, and divided into groups of like sex and unlike sex, has been analysed as regards distributions, means and standard deviations of mother's age, order of birth, birth weight and length of gestation time.

In birth weight the unlike sex have greater means than the like sex, from which it may be deduced that dizygotic twins are heavier at birth than monozygotic.

The correlation of birth weight in twins is 0.727 for like and 0.676 for unlike sex.

Length of gestation time has a correlation with birth weight of 0.345 for like and 0.403 for unlike sex.

Neonatal mortality (including stillbirths) is high for twins, being 16.6% as compared with 4.5% in single births. When these rates are sub-divided into groups of birthweight, it is found that the rates for the very low weight groups are a little better for twins than for single births, but those round the mean and above it are about 3 times those for single births of average or above average weight.

The mortality rates are a little lower for twins of unlike sex.

## References

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## SOMMARIO

Un collettivo di 583 parti gemellari (distinto in due gruppi pressochè eguali - $\text{p} \text{ oppo } \text{p}$  lo stesso sesso e coppie di sesso opposto) è stato raccolto dagli schedari delle nascite di due Ospedali Inglesi (1927-1946), per studiare le distribuzioni, le medie e le deviazioni standard dei seguenti caratteri: età della madre, ordine di generazione, peso alla nascita, durata della gravidanza.

L'analisi statistica dei dati ha rivelato che:

1) la media del *peso alla nascita* nelle coppie gemellari di sesso diverso è più elevata che

in quelle dello stesso sesso. Di qui si deduce che i gemelli bivulari sono alla nascita più pesanti di quelli monovulari;

2) l'indice di correlazione del *peso alla nascita* è leggermente più elevato tra i gemelli dello stesso sesso (0.727) che tra quelli di sesso opposto (0.676);

3) viceversa, l'indice di correlazione tra la *durata della gravidanza* e il *peso alla nascita* è leggermente più basso nelle coppie gemellari dello stesso sesso (0.345) che in quelle di sesso opposto (0.403);

4) la percentuale di neonato-mortalità (comprendendovi i nati morti) è sensibilmente più elevata nei parti gemellari

(16.6%) che nei parti semplici (4.5%);

5) quando si calcoli tale percentuale di neonato-mortalità dopo aver distribuito il materiale in classi a seconda del *peso alla nascita*, risulta evidente che essa è leggermente diminuita nei parti gemellari per le classi di peso molto al di sotto della media, mentre sale ad un valore circa tre volte più elevato di quello dei parti semplici, per quelle classi di *peso alla nascita* intorno o al di sopra della media;

6) la percentuale di neonato-mortalità nelle coppie gemellari dello stesso sesso è leggermente più bassa che tra le coppie di sesso opposto.

## RÉSUMÉ

On a analysé un échantillon de 583 jumeaux, divisé en groupes de sexe mâle-mâle, et femelle-femelle, et de mâle-femelle, accouchés en deux en hôpitaux anglais. On a donné les distributions, les moyennes et les déviations types de l'âge maternel, du rang de naissance, du poids de naissance et de la durée de la gestation.

Les jumeaux de sexe dissimilaire ont le poids moyen de naissance plus grand que les ju-

meaux de sexe similaire; d'où on peut déduire que les jumeaux dizygotiques sont de poids plus grand que les jumeaux monozygotiques.

La corrélation du poids de naissance et de la longueur de gestation est 0.727 pour le sexe similaire, et 0.676 pour le sexe dissimilaire.

La longueur de gestation a une corrélation avec le poids de naissance de 0.345 pour le sexe similaire et 0.403 pour le sexe dissimilaire.

La mortalité néonatale est grand pour les jumeaux, étant

16.6 per cent. comparé avec 4.5% pour les naissances simples. Si on divise ces valeurs en groupes selon poids on trouve que pour les poids très petits elles sont un peu meilleures pour les jumeaux que les naissances simples, mais ces autour de la moyenne et au-dessus sont trois fois les valeurs pour les naissances simples au poids moyens et au-dessus.

La mortalité néonatale est un peu mieux pour les jumeaux du sexe dissimilaire, correspondant peut être à leur poids plus grands.

#### ZUSAMMENFASSUNG

Eine Beobachtungsreihe von 583 Zwillingen, die in zwei englischen Krankenhäusern geboren wurden und in Gruppen von gleichgeschlechtlichen und solche ungleichen Geschlechtes geteilt waren, wurde hinsichtlich ihrer Verteilungen, der Durchschnittswerte und der Standard-Abweichungen vom Alter der Mutter analysiert, sowie nach ihrer Stelle in der Geburtenfolge, dem Geburtsgewicht und der Schwangerschaftsdauer.

Das Geburtsgewicht von Zwillingen ungleichen Geschlechtes weist grössere Durchschnittswerte auf als das von gleichgeschlechtlichen, woraus gefol-

gert werden kann, dass zweieiige Zwillinge bei der Geburt schwerer sind als eineiige.

Die Korrelation des Geburtsgewichtes ist bei gleichgeschlechtlichen, woraus gefolgert werden kann, dass zweieiige Zwillinge bei der Geburt schweren sind als eineiige.

Die Korrelation des Geburtsgewichtes ist bei gleichgeschlechtlichen Zwillingen 0.727 und bei solchen ungleichen Geschlechtes 0.676.

Die Schwangerschaftsdauer hat eine Korrelation mit dem Geburtsgewicht von 0.345 für gleichgeschlechtlich und von 0.403 für Zwillinge ungleichen Geschlechtes.

Die Sterblichkeitsziffer von

neugeborenen Zwillingen ist im Vergleich zu Einzelgeburten hoch. Sie beträgt in ersterem Falle 16.6% und bei Einzegeburten 4.5%. Wenn diese Ziffern in Gruppen von Geburtsgewichten geteilt werden, zeigt es sich, dass diese Prozentsätze in sehr niedrigen Gewichtsgruppen, für Zwillinge ein wenig höher sind als für Einzelgeburten. Aber diejenigen um den Durchschnittswert und darüber sind ungefähr dreimal so gross als jene für Einzelgeburten mit durchschnittlichem und überdurchschnittlichem Gewicht.

Die Sterblichkeitsziffern sind ein wenig niedriger bei Zwillingen ungleichen Geschlechtes.