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MANCHESTER STATISTICAL SOCIETY.

On the Relative Proportion of the Sexes.

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[Read March 18th, 1874.]

It is a fact, well known to those interested in statistical inquiries, that in all countries where births are recorded the registers would lead one to suppose that more of the male, than of the female sex enter the world. In England, the proportion, from 1857 to 1866, was 104·5 males to 100 females. In 1857, male births were as 105·2, and in 1865, as 104·0 to 100. The same curious circumstance holds good of other countries. Quetelet* has given a table based on the researches of Captain Biekes, the result of seventy million cases. The average varies in different states from 105·38 to 108·91, but the average for Europe generally is 106·00.

In a Paper by M. A. Legoyt in the *Journal des Economistes* (3rd S. x. 196, mai, 1868,) there is the following interesting table:—

TABLE I.

Proportion of Male Births to every 100 Female Births, Legitimate and Illegitimate, in various States of Europe.

	Periods.	Legitimate.	Illegitimate.
Austria	1853-1857	106·22	105·27
Bavaria	1856-1860	106·98	103·71
Belgium	1841-1860	105·47	102·53
France.....	1858-1860	105·16	103·79
Hanover	1854-1858	106·46	96·87
Italy	1863-1864	106·09	102·10
Netherlands	1850-1859	105·53	103·32
Saxony	1858-1861	106·18	103·85
Sweden	1856-1860	104·96	102·12
Norway	1841-1860	105·21	103·44

* Quetelet sur l' Homme, i. 43.

Babbage has given several tables in his letter, "On the proportionate number of Births of the two sexes, under different circumstances." (Brewster's "Edinb. Journal of Science," i. 85, 1829.) But it is not necessary to re-produce these, as the results are generally identical with those stated in the above table.

"It is a singular fact," says Mr. Darwin, "that with the Jews the proportion of male births is decidedly larger than with Christians: thus, in Prussia the proportion is as 113, in Breslau as 114, and in Livonia as 120 to 100; the Christian births in these countries being the same as usual, for instance, in Livonia as 104 to 100. It is a still more singular fact, that in different nations, under different conditions and climates, in Naples, Prussia, Westphalia, France, and England the excess of male over female births is less when they are illegitimate than when legitimate."*

These two propositions that there are more males than females born, but that the excess is smaller amongst "natural" children than those born in wedlock, are supported by the general testimony of all European birth-registers, and have been very generally accepted by statistical writers. Many ingenious conjectures have been framed to account for the disparity, but a late writer, and one not likely to err on the side of rashness, has thrown doubts upon the reality of the alleged facts.

Mr. W. L. Sargant, whose observations are entitled to the highest respect and consideration, in his "Essay by a Birmingham Manufacturer," has thus expressed his own explanation of the figures:—

"Another misunderstanding as to births, is far less simple than the one I have mentioned above. It is well known, that among the births registered, the males everywhere exceed the females; the excess is generally called five per cent., but it is not commonly known that it varies in different places from four to six per cent. The ordinary notion is that 105 boys are regularly born to 100 girls. A sceptic, like myself, long familiar with statistical lies, may be excused if he demands further inquiry, if he suggests that

* "Descent of Man," 1871, p. 301.

“birth-registers may be inaccurate, and may be more inaccurate in
 “one place than in another. But supposing inaccuracy, would not
 “that be found equally as to both sexes? I think not: I believe that
 “throughout the world the birth of a boy is more of an event, and
 “that feudal customs as to descent of land, have exaggerated this
 “natural preference in modern Europe. It is not unlikely, there-
 “fore, that male births are more carefully registered than female;
 “and that part of the apparent excess of male births is owing to
 “this cause.

“If we come to the births of illegitimate children, the circum-
 “stances are different. In England, at any rate, the mother of an
 “illegitimate registers its birth not with any view to a possible
 “inheritance, not from the expectation of continuing a family, but
 “to get a claim on the putative father. Now this is equally
 “important, whether the child is a boy or a girl. In this country,
 “therefore, we may assume that the two sexes are equally
 “registered in the case of illegimates; and as many legitimate
 “boys are probably better registered than girls, it follows that,
 “judged by the register, the excess of boys over girls will be the
 “greater in the case of legitimates. Suppose:—

“Legitimate..	Born 105 boys and 102 girls, registered	
	104 boys and 102 girls.....	Excess 4
“Illegitimate..	Born 105 boys and 102 girls, registered	
	104 boys and 101 girls.....	Excess 3

“Now, this difference between legitimate and illegitimate has
 “been a copious source of debate. The explanation I have given
 “not having been thought of, it has been believed that there existed
 “a real difference between legitimates and illegimates, as to the
 “proportion of the sexes; and the cause of that difference has been
 “inquisitively sought. Strange explanations have been offered; the
 “most popular, I believe, being that a great proportion of illegiti-
 “mates are the first children of their mothers, and that, *perhaps*,
 “first children are more often females than are their successors.
 “A *perhaps* is not a satisfactory basis for an explanation—Con-
 “jectural statistics again!

“It may be thought, however, that my explanation is founded on a conjecture, on a “perhaps boys are better registered;” but this is not so. The notion occurred to me as an explanation of a difficulty which arose in another investigation: the notion appears to me to be far higher than a conjecture; because, while it is in itself highly probable, it harmonizes facts otherwise unexplained, and therefore rises from conjecture to hypothesis, and from hypothesis to theory.

“The facts are these. In a paper I read to the Statistical Society, in 1865, I inquired whether the Census of 1861 gave results consistent with the figures of the Registrar General. If, in a certain town during the twelve months preceding the Census, there had been registered 1,000 births and 200 deaths out of these children born, the Census ought to have shown 800 infants under a year old; if, in England, there had been registered 600,000 births, and 100,000 deaths out of these, the Census ought to have shown 500,000 infants under a year old. There would, of course, be some disturbance by emigration, and by migration from Scotland and Ireland, and from county to county. Taking all these circumstances into account, I found that the Census had much understated the numbers of infants. For the present, I will not enumerate the particulars; I will confine myself to those which bear upon the question before us. The infants, I say, were greatly understated, if we were to believe the Registrar General’s figures: so many births, so many deaths, so many, therefore, left alive; what had become of those who did not appear in the Census? But the most perplexing circumstances was this:—

“Understated in the case of boys, 12 per cent,

“ ” ” ,, girls, only 10½ per cent.

“Was it likely that in so mere a form as hastily filling up a printed Census paper, not to be preserved as evidence, a parent would remember one sex more than the other? Revolving the matter, I saw that the difference might arise in registering the births; then I thought of the possibility that many parents would be more intent on registering a boy than on registering a girl. After discussing

“this with competent friends, I concluded that there was a high probability of this preference existing; and as the conjecture solved the problem, I regarded it as a fairly established theory.

“My explanation then is not founded on a perhaps, but on figures otherwise unexplained. I conclude that the difference between legitimates and illegitimates as to the disproportion of the sexes at birth is apparent and not real, and is the result of defective registration: more defective in the case of legitimate girls than in the case of illegitimate girls. As to those who say that illegitimates are often first children; and that perhaps first children have more girls among them than other children have, let them count some thousands of first children of each sex, and give us the result.”

Now, in considering if the apparent excess is a matter of registration, it seems necessary to learn what is the proportion of male to female births in cases where the disturbing influence which Mr. Sargant has mentioned is not operative.* As we are so dependent upon birth-registers, it will be palpable that evidence of the kind required cannot be obtained with the same ease or to so great an extent as in the other case. A sufficient number, however, can be adduced bearing upon this point.

In the case of the Royal Families of Europe we have in historical and genealogical books a full account of all their marriages and issue. The *Almanach de Gotha* is regarded as a semi-official publication, and may be regarded as a faithful register of all those who are members of the Royal houses. Taking the first part for 1873 which relates to actual reigning families, after

* In a note to the writer, Mr. Sargant says:—“Allow me to point out that in my paper I only say that *part* of the excess of registered male births is to be attributed to registration. You seem to understand me to dispute *all* excess of males. As to the theory I am combating, your figures knock it on the head. That theory turns on a ‘perhaps more first children are females.’ Your table, page , makes out the contrary as 2622 males compared with 2365 females=11 per cent. $\frac{8548}{8069}=6$ per cent., or deducting first-born $\frac{5926}{5704}=4$ per cent.”

rejecting all ambiguous instances, there remain 328 male births to 257 female births—an excess of males scarcely credible. Of first fruits of marriage, there were 101 male to 83 female births.

Dr. J. Campbell gives the result of his inquiries as to the relative proportion of the sexes amongst the children born in the harems of Siam, and the result of his enumeration is that 17 heads of families had by 191 different mothers, 229 sons and 211 daughters, which shows that there polygamy does not as is generally supposed lead to a larger number of female births.*

Next in reliability come the statistics of the peirage.

Mr. Sadler has given a table exhibiting the ages of 1627 peers at their marriage, and the number and sex of their children, from which the following figures are taken:—

TABLE II.

Age of the Peers at Marriage.	Number of Marriages.	Male Births.	Female Births.
Under 21.....	54	143	124
21 to 26.....	307	668	712
26 ,, 31.....	284	696	609
31 ,, 36.....	137	298	263
36 ,, 41.....	90	149	151
41 ,, 46.....	58	93	83
46 ,, 51.....	51	79	83
51 ,, 56.....	19	15	11
56 ,, 61.....	11	12	6
61 ,, 66.....	12	3	4
66 and upwards.	4	2	4
Totals....	1027	2158	2050

The next series of figures I have been able to get are both more extensive and more decided than those so far presented. They

* "Journal of Anthropology," Oct. 1870., p. 194.

were tabulated by Dr. Robert Collins, not with reference to the question we are now discussing, but with relation to the periods of births. Dr. Collins, in a paper on that subject read before the British Association, in 1837, gave the result of 16,000 cases which had come under his notice as master of the Dublin Lying-In Hospital (1826-32). The following table is taken from it, but the third and last columns has been added for ease of comparison:—

TABLE III.

MONTHS.	Total children born Monthly.	No. of Males in each Month.	No. of Females in each Month.	Premature Births in each Month.	Premature First Children.	Total First Children.	Premature Males in each Month.	No. of First Children Males.	No. of First Children Females.
January	1493	761	732	89	18	418	23	209	209
February	1315	676	639	84	10	366	19	190	176
March	1475	754	721	88	15	410	17	216	194
April	1382	738	644	43	12	405	17	225	180
May	1375	701	674	44	14	417	19	203	214
June	1352	702	650	42	10	391	24	216	175
July	1389	747	642	41	17	405	24	221	184
August	1366	718	648	49	14	440	28	234	206
September	1367	686	681	34	13	407	16	220	187
October	1371	663	708	54	22	434	26	227	207
November	1369	701	668	34	13	472	19	254	218
December	1363	701	662	46	14	422	23	207	215
TOTALS	16617	8548	8069	498	172	4987	255	2622	2365

Excess 6 per cent.

Excess 11 per cent.

In this Dublin Hospital, then, there is an excess of males in all births of 6 per cent; of first-born, 11 per cent.; of births excluding first-born (viz., $\frac{8548-2627}{8069-2365}$ or $\frac{222}{5704} = 4$ per cent.), 4 per cent.

By the kindness of Mr. Runcorn, the House Surgeon of St. Mary's Hospital, in this city, the number of births in connection with that institution in one year, (1834) has been obtained. The number of male births was 2153, and of female births 1758.

We have then the following results :—

TABLE IV.

	Males.	Females.	Males to 100 Females.
Statistics of Royal Families of Europe..	328	257	128·3
——— Siamese harems	229	211	109
——— English Peerage	2158	2050	104
——— Dublin Lying-in Hospital..	8548	8069	105·5
——— St. Mary's Hospital, Man- chester.....)	2753	1758	119·4
Total	13416	12430	.

The experience of 25,761 cases, to which the disturbing influence of the supposed better registration of male births does not apply, shows that there is a natural law in obedience to which more males than females enter the world. With regard to the sex of the first-born, there are, perhaps, not sufficient instances to warrant a generalization, but the preceding tables give 5,181 first births of which 2,733 were boys and 2,448 were girls. This excess of male first-born supports Mr. Sargant's view, and is fatal to the theory he combats; a theory that assumes an excess of females among first-born as compared with others.

This is the principal object of my paper, but it may not be without interest to mark the variations in the proportion of the sexes at different periods of life. The annexed table will show these changes:—

TABLE V.

Age.	Population of England and Wales at various ages.		Age.	Population of England and Wales at various ages.	
	Males	Females.		Males.	Females.
Under } 1 yr. }	344,742	342,148	40 yrs.	590,097	639,705
1 year.	297,215	296,778	45 ,,	506,947	546,094
2 ,,	306,667	307,494	50 ,,	455,788	488,901
3 ,,	297,253	299,068	55 ,,	345,907	372,261
4 ,,	290,587	289,329	60 ,,	294,675	328,010
5 ,,	1,350,819	1,355,707	65 ,,	205,370	235,868
10 ,,	1,220,770	1,203,469	70 ,,	149,887	174,086
15 ,,	1,084,713	1,095,669	75 ,,	82,091	99,896
20 ,,	951,917	1,052,843	80 ,,	38,573	51,265
25 ,,	843,278	937,299	85 ,,	11,685	17,896
30 ,,	746,320	813,675	90 ,,	2,383	4,338
35 ,,	640,819	700,534	95 ,,	390	855
			100 ,,	41	119

One of the most striking facts of social statistics, so far as the old world is concerned, is the redundancy of women.

Mr. Greg quotes the following table from the supplement to the Reports of the Statistical Congress of Paris.

TABLE VI.

England (1851)	103·29 females to 100 males.
France	101·08 ,, ,, ,,
Turkey (1844)	101·62 ,, ,, ,,
Austria (1840)	102·99 ,, ,, ,,
Prussia (1849)	100·07 ,, ,, ,,
Russia (1855)	101·60 ,, ,, ,,
United States (1850)	95·02 ,, ,, ,,

In America, according to their last Census, there are still more men than women, the figures being :—

Males.....	6,086,872
Females	5,968,571

There was then a male surplus of a quarter of a million. At home we have to deal with very different figures. "Of the 31,628,338 inhabitants of the United Kingdom, in 1871, it appears that 15,368 were males and 16,260,213 were females, so that there was an excess of female population within the United Kingdom, in 1871, of 892,088. There were 207,198 males in the army, navy, and merchant service abroad; so that the excess of females when these are counted is 718,566."*

This excess of female adult population is the result of various and complex causes. Male children are subject to a higher death rate, and the risks to which they are exposed in after life, are greater than with the opposite sex. The army and navy absorb thousands, and it may almost be said that the stream of emigration, which has been steadily flowing from this country for above a generation, has borne on its waves men only. The extent of female emigration is very trifling. My paper is a pure statistical one, and I refrain from moralizing; but surely one of the most painful adjuncts of European civilization are these thousands of women who can never become wives and mothers, and to whom so many of the ordinary roads to fortune and fame are barred by social prejudice and caste feeling.

* "Drysdale on the Population Difficulty," 1873, p. 7.