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Note on Reproductive Selection

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original figures seem to have been the crude rate for males and females separately from 1835 onwards." Why the writer of these words should have assumed them without any inquiry of me, or any examination of the values of the crude death-rates (which are accessible to everybody) to be "crude death-rates," I do not know, but they illustrate his readiness to form a biased judgment when his feelings are stirred by unfavourable criticism. As a matter of fact the rates were *standardised* rates reduced to the population of 1901, and most kindly provided at my special request by the General Register Office. It is of interest to observe that Dr Weinberg of Stuttgart—recently made precisely the same charge as Mr Major Greenwood with the same over-hasty assumption that the reality must be the desired, if undemonstrated, error*. With the German as with other foes, it is well to leave ample opportunity for their assuming you to be foolish; their assumption may lead them to run against hard reality.

K. P.

IV. Note on Reproductive Selection.

By DAVID HERON, D.Sc.

The fact that in the case of man† fifty per cent. of one generation comes from twenty-five per cent. of the preceding one was first noted by Professor Karl Pearson in the *Chances of Death* (Vol. I. p. 80) and in dealing more fully with this important generalisation in the *Groundwork of Eugenics*, p. 27, he said: "It is very difficult from any English statistics to determine how many adults never marry. No information on this point is asked in the death schedule for males; it is asked but imperfectly answered in the case of the schedule for females." In a footnote he adds: "The Registrar-General informs me that the record of civil condition in the case of female deaths is worthless and that no useful return can be made from it." He found that in the Argentine and in Scotland 60 per cent. died unmarried, in the United States 51 per cent., and from the last two English Censuses and the Annual Reports 48 per cent., and added "This indirect method of reaching the result is, however, not very satisfactory. We may, I think, conclude in round numbers that 40 per cent. of the population dies before it reaches the age of 21 and that probably another 20 per cent. are never married." On this assumption Professor Pearson proceeds to show that "about 12 per cent. of all the individuals born in the last generation provide half the next generation."

Some data published in *Bulletin of Population and Vital Statistics No. 30 for the Commonwealth of Australia* (Tables 48 and 84 a and b) prove that the assumptions made lie very close to the facts. The data are shown in the following table which gives the conjugal condition and issue of the males and females who died in Australia in 1912. From this we find that half the total number of children came from 3337 of the parents (all those who had at least 9 children and part of those who had each 8 children). It thus appears that of the males 17,404 out of 30,285 = 57.5% died unmarried while half the total offspring came from 25.9% of those who married and 11.0% of the whole number of males, so that approximately three-fifths of the males born die unmarried and one-half of one generation comes from one-quarter of the married population or from one-ninth of all the males born in the preceding generation. The diagram gives a graphical illustration of the argument.

In exactly the same way we find that nearly one-half of the females born in Australia die unmarried and that one-half of one generation comes from one-quarter of the married and from one-seventh of all the females born in the preceding generation.

* *Archiv für Rassen- und Gesellschafts-Biologie*, ix. Jahrgang, S. 87. Leipzig, 1912.

† It has also been dealt with in various mammals. See the *Groundwork of Eugenics*, Eugenics Lecture Series II (Dulau and Co.), p. 29.

Conjugal Condition	Children in Each Family	Deaths of Males	Total Children	Deaths of Females	Total Children
Single	0	17404	—	10011	—
Married	0	1422	—	1317	—
"	1	1036	1036	1083	1083
"	2	1098	2196	992	1984
"	3	1127	3381	1050	3150
"	4	1147	4588	1001	4004
"	5	1070	5350	976	4880
"	6	1058	6348	1013	6078
"	7	1040	7280	974	6818
"	8	992	7936	881	7048
"	9	819	7371	799	7191
"	10	801	8010	622	6220
"	11	473	5203	469	5159
"	12	394	4728	314	3768
"	13	196	2548	193	2509
"	14	109	1526	101	1414
"	15	50	750	57	855
"	16	27	432	22	352
"	17	7	119	8	136
"	18	5	90	3	54
"	19	6	114	2	38
"	20	3	60	2	40
"	21	—	—	1	21
"	22	—	—	1	22
"	23	1	23	—	—
Totals		30285	69089	21892	62824

Diagram to illustrate the fact that three-fifths of those born die unmarried and that one-ninth of one generation produce one-half of the next. (Deduced from records of males.)