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SIR DAVID BREWSTER, President, in the Chair.

The following Communications were read:—

1. On the Laws of the Fertility of Women. By J. Matthews
Duncan, M.D.

This paper was a sequel of a paper read to the Royal Society, and published in the 23d volume of the "Transactions." That paper was entitled, "On the Variations of the Fertility and Fecundity of Women, according to age;" and among other conclusions therein announced, was one to the effect that fecundity, or likelihood of child-bearing after marriage, increased from the earliest child-bearing age till about twenty-five, and thereafter gradually decreased. In the present paper, the laws regulating such fertility after marriage are demonstrated. The chief data on which the arguments for these laws are based are derived from an analysis of 16,301 families, in connection with which entries were made in 1855 in the public registers for Edinburgh and Glasgow.

The fertility of marriages in Scotland is shown by the reports to the Registrar-General to be about 4.64 children to a marriage. But this statement is of no physiological value, since all marriages are included in it, comprising those at all ages and of all durations, &c. A statement of the fertility of Scottish wives, a little more

exact, is got by dividing the number of married women of child-bearing age by the number of legitimate children born, all in the same year. It is thus found that every 3·55 wives, aged from fifteen to forty-five, add one to the population annually.

The fertility of all marriages in Edinburgh and Glasgow that were fertile in 1855 is found to be 3·7 children to a marriage. The fertility of fertile marriages enduring for the whole child-bearing period of life is shown to be on an average ten children to a marriage; and as the average interval between successive births is about twenty months, fertile women, living in wedlock, from fifteen to forty-five, are fecund for about seventeen years.

The fertility of persistently fertile marriages, lasting during the whole child-bearing period of life, is shown to be at least fifteen children to a marriage. Persistently fertile wives, taken at any duration of marriage, are found to have born at the rate of a child very nearly every two years.

It is shown that, at any epoch in married life, the average number of a fertile woman's family is one-third of the number of years elapsed since her marriage, and that the number of a persistently fertile woman's family is one-half of the number of years elapsed since her marriage. These numbers vary according to the age of the wives at marriage — a circumstance which is subsequently explained.

The average interval between marriage and the birth of a first child is shown to be seventeen months. Inclusive of this period, the interval between the births of successive children is twenty months. In average families, the first four children succeed one another more rapidly than the next six—that is, on to the tenth. But in large families, or those above ten, the children, from the first, do comparatively hurry after one another with brief intervals.

Fertile women, married at different ages, have an amount of fertility which decreases as the age at marriage increases; and this greater total fertility arises from the greater continuance or persistence in fertility of the younger married. Women married at higher and higher ages have a shorter career of fertility. This perseverance in fertility explains why the women married from fifteen to twenty years of age have a greater fertility than those married from twenty to twenty-five, who have the highest fecundity or like-

lihood to have children, and specially a greater probability of being fertile than those married from fifteen to twenty.

Wives who are persistently fertile are more fertile the older they were at the time of marriage. In other words, the older a woman, destined to be fertile, is at the time of marriage, the greater will be her fertility so long as it lasts. The fertility of a woman old at marriage is greater than that of a woman young at marriage; yet the total fertility of women married young far exceeds that of women married when elderly, reckoning for both sets equal durations of marriage, and all within the child-bearing period; because of the younger a far larger proportion are fecund, and because the younger have a far longer continuance of fertility.

The increasing frequency of twin-births as age advances is explained by this law of increasing intensity of fertility as age advances.

Women married when elderly have been supposed by some authors to have a special postponement of the generative orgasm, to enable them to bear children beyond ordinary periods. But this is shown not to be the case, by the circumstance that most women child-bearing at very high ages are already mothers of considerable families.

2. On the Classification of Chemical Substances by Means of Generic Radicals. By Dr Alexander Crum Brown.

In this paper the author proposes to use for purposes of classification those radicals or parts of molecules which are common to *genera* of substances, and within which the changes characteristic of these genera take place. Thus the carbon acids contain the