under corresponding circumstances is 1:2:1; that is, there should be one pair of boys, to two mixed pairs, to one pair of girls. In other words, if the members of a pair of twins always developed from separate ova, we should expect to find twice as many pairs whose members differ in sex, as there are pairs of girls, or pairs of boys. I have been able to think of no factor which may reasonably be supposed to be acting in a constant direction to alter this ratio.

I have undertaken to compare with this hypothetical ratio the ratio found among births of twins in this country. My data number 3,334 twin births which occurred in the states of Connecticut, Maine and Vermont during the years 1899 to 1912. Of this number 1,118 are pairs of boys, 1,193 are boy and girl, and 1,023 are pairs of girls. This is almost a 1:1:1 ratio, showing the effect, however, of the predominance of male births. There is obviously a large excess of pairs similar in sex over what is to be expected on the supposition that twins originate in all cases from separate ova, an excess of more than 500 pairs of boys, and almost 500 pairs of girls.

This seems to point towards the conclusion that twins may originate from a single fertilized ovum. In the light of present knowledge this certainly is a possible explanation of the statistics. If the figures given will bear this interpretation, we may say that less than half (44.3 per cent.) of the twin births of similar sex, or less than one third (28.4 per cent.) of all twins, originate from one ovum, while slightly more than half (55.7 per cent.) of those of similar sex have developed simultaneously from two separate ova.

Margaret V. Cobb

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Naturalist's Directory

To the Editor of Science: As you have given liberal space to criticize the book, you will doubtless be willing to give space in which I can explain the matter.

In the first place this book has not been issued for some eight years, and in getting out the new edition I decided that not a single name would be included unless I had a request that the name should be included from each party. If you find that there are a good many naturalists omitted from the directory, it was because they were too busy, or more likely too careless of such matters to take time to return the blanks which I sent them. Every naturalist of any consequence, and a great many collectors, received three notices each and none of the names were included in the book unless they replied.

Since getting out the work some of these noted scientists have taken time to write three or four criticisms of the book, while they would not take time before publication to even sign their names to the blanks I sent them. There are a few typographical errors in the book as there are bound to be in any work of this kind, and the transposition of two or three entries, to which you have taken great pains to call attention, was caused by the misplacement of one or two linotype slugs.

It is my intention to get out another edition of the Naturalist's Directory in a year from now, and I hope naturalists, generally, will be as free with their assistance in bringing the new edition up to date, as they have been in criticizing the edition just published.

S. E. Cassino

Salem, Mass.

Scientific Books

Die Variolation im achtzehnten Jahrhundert. Ein historischer Beitrag zur Immunitätsforschung. By Arnold C. Klebs. Giessen, A. Töpelmann. 1914. 8vo. Pp. 78.

Few physicians know that throughout the entire eighteenth century, and before Jenner's time, there was a vast wave of experimental research in the problem of preventive inoculation against disease, now almost forgotten. Starting in 1713, it passed into a period of twenty years' stagnation about 1727, with a revival in 1746 and a truly scientific phase during 1764–98. When a bibliography of some 600 titles, by the author of the above monograph, was shown to a highly educated physi-