fend in cold blood; thus (p. 19) "even the destructive bacteria which are killed by the sun probably enjoy an exquisite shudder in the process which more than compensates them for their extinction"; and (p. 344) "every step which he [the house-fly] takes he plants a few dozen microbes, which include those of infantile diarrhœa, typhoid and other prevalent diseases,"—a gross exaggeration in a chapter which very properly calls attention to the great harm done by flies as carriers of bacteria.

The time has certainly come for scientific men in America to attack the problem of scientific journalism in an organized and deliberate manner. The individual naturalist is more or less helpless. When I was curator of the museum in Jamaica I contributed weekly articles to the newspapers of Kingston, which printed them as written, and even illustrated them when requested. These articles interested a good many people and were the cause of many visits and contributions to the museum. In Colorado I have tried the same thing, and given it up in despair. The papers will not print things accurately or in full, and will often supply headlines of the most ridiculous kind. Here is a typical incident. A friend of mine shot a large eagle and measured it from tip to tip of the wings. Thinking the matter of interest, he handed in the item to a daily paper. The editor, with the best of intentions in the world, added a foot to the measurement, with the result that my friend appeared to those who knew anything of eagles a remarkable liar! These troubles are not confined to the wild and woolly west. Even the *Outlook*, certainly one of our best-edited journals, recently published an article on A. R. Wallace which contained in the first column a number of errors concerning the best-known facts of his life.

It is not true, of course, that the newspapers *always* select incompetent writers on scientific subjects, or *always* distort accurate information communicated to them; but if they are to be the means of enlightening the public concerning the discoveries of science, they must *never* do these things, except through such unfortunate accidents as can not perhaps wholly be avoided. One can not write to the papers if the chances are one in five or ten that one will be exhibited as a fool or liar, and the public misled as to the facts.

T. D. A. COCKERELL

SPECIAL ARTICLES

A NOTE ON SEX DETERMINATION[1]

OF the many hypotheses that have been advanced to explain the determination of sex, one group seeks to show that in bilateral animals the sex of the offspring is dependent upon the right or left source of the effective genital element in that right glands produce offspring of one sex, left glands those of the other. Such a general theory may be applied, of course, to either the ovary or the testis. Thus Seligson (1895)[2] formulated the hypothesis that in mammals the right ovary gives rise to eggs that produce male offspring, the left to eggs that produce female offspring.

In collecting a body of data to show the relation of the size of litters to the number of nipples in swine (Parker and Bullard, 1913),[3] certain facts appeared which have a bearing on such hypotheses. The records brought together in this connection included the position that the young pigs occupied in the uterus and their sex. In reasonably large litters it was therefore possible to make a rough comparison of the products of one ovary with those of the other by contrasting the young pigs in one horn of the uterus with those in the other. The possibility of the migration of an egg from one side of the body to the other could not be excluded, but to reduce to a minimum the effect of this on the statistics and to make the comparison as striking as possible, the

[1] Contributions from the Zoological Laboratory of the Museum of Comparative Zoology at Harvard College, No. 245.

[2] Seligson, E., "Zur Bestimmung und Entstehung des Geschlechts," *Centralbl. für Gynäkol.*, Bd. 19, pp. 590–595, 1895.

[3] Parker, G. H., and C. Bullard, "On the Size of Litters and the Number of Nipples in Swine," *Proceed. Amer. Acad. Arts and Sci.*, Vol. 49, pp. 397–426, 1913.

whole contents of horns were not compared, but the pairs of animals next the right and the left ovaries were contrasted, so far as their sexes were concerned, with the pairs at the junction of the horns, the presumption being that the pure products of each ovary would occur most frequently next that organ and the mixed products of the two ovaries midway between them. The details thus brought together are shown in the following table.

TABLE

This table shows the frequency of occurrence of pairs of unborn pigs of various combinations of sexes at the division of the horns of the uterus, next the right ovary, and next the left ovary.

Composition of Pairs		♂♂	♀♀	♂♀
Observed frequencies	At division of horns	252	240	456
	Next right ovary	228	209	434
	Next left ovary	216	208	447
Percentage frequencies	At division of horns	26.6 −	25.3 +	48.1 +
	Next right ovary	26.2 −	24.0 −	49.8 +
	Next left ovary	24.8 −	23.9 −	51.3 +

It is fair to assume that at the division of the horns of the uterus the offspring are likely to be as often from one ovary as from the other. If in the whole population the males and females are equally abundant, three classes of pairs would be expected to occur and in the following proportions: 25 per cent. of the pairs would be composed of two males; 25 per cent. of two females; and 50 per cent. each of a male and a female. That this condition is very nearly realized is seen from the table, where it will be observed that the pairs of males are present to the extent of 26.6 — per cent., the females 25.3 + per cent. and the pairs of the two sexes combined 48.1 + per cent. The fact that the table shows a few more pairs of males than females is due to the condition of the population as a whole, in which the males outnumber the females by 1,026 to 1,000. This slight digression from equality also has its effect on the relation of the numbers of pairs composed of both sexes to those of one sex only, but the total number of records is probably too small to yield very smooth results in this respect.

If, as Seligson maintained, the right ovary gives rise to male and the left to female offspring, the pairs of pigs next the right ovary ought to be predominantly males and those next the left predominantly females. That such is not the case is seen at once from the table, where it is shown that pairs composed of two males or of two females occur in about the same proportions next the right ovary that they do next the left, a proportion that is very close to that occurring at the division of the horns of the uterus. These statistics, therefore, give no support to hypotheses, such as Seligson's, according to which the eggs from the ovary of one side of the body produce offspring of one sex only.

Although the sex of the offspring is thus shown not to be correlated with the side of the body from which the egg that gave rise to the young came, it might be supposed that in any female a given ovary would always produce offspring of the same sex. In that case we should expect to find the great majority of pairs of young next the ovaries to be either both males or both females. But, as the table shows, there are almost as many pairs composed of one male and one female next the ovaries as there are at the division of the horns. Hence we may conclude that in the pig the ovaries by virtue of their position in one or other half of the maternal body exert no influence on the sex of the offspring, but that each ovary produces eggs which may give rise to either male or female offspring. This conclusion is in line with such experimental work as that of Doncaster and Marshall (1910),[4] and of King (1911)[5] on albino rats, according to which a single ovary, after the removal of its mate, can give rise to eggs which produce males and females.

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[4] Doncaster, L., and F. H. A. Marshall, "The Effects of One-sided Ovariotomy on the Sex of the Offspring," *Jour. Genetics*, Vol. 1, pp. 70–72, 1910.

[5] King, H. D., "The Effects of Semi-spaying and Semi-castration on the Sex Ratio of the Albino Rat (*Mus norvegicus albinus*)," *Jour. Exp. Zool.*, Vol. 10, pp. 381–392, 1911.