QUOTATIONS

DYES FOR BACTERIOLOGY

BACTERIOLOGISTS in this country and in the United States of America are anxious about the supply of chemical dyes used in their work. Animal tissues and the microbes which may infest them, as seen under the microscope, present to the eye an almost uniform appearance of pale translucency. A skilled treatment with dyes and mordants reveals the otherwise invisible differences of structure and composition. Particular cells and granules, bacteria and spores, have affinities for particular stains, and betray their presence by the colors they absorb. The presence, the quality, and even the phase of an infection or of a morbid state are thus detected, and the processes are a necessary part of research, diagnosis, and treatment. But the reactions are delicate, and their value depends on a high purity and standardization of the reagents employed. The materials are almost entirely the aniline dyes used in textiles. Before the war Grübler in Germany had examined these and selected those that might be of use to biologists. The total bulk of the trade is very small, and the German manufacturer had taken so much trouble to standardize his products and secure their purity that he had a practical monopoly and was able to charge a high but legitimate price. When the war came, in 1914, a few fortunate institutions had in hand a stock of the Grübler reagents sufficient to meet their wants. But the greater number of biologists were soon in difficulties. Here and in the United States several manufacturers, partly from patriotic motives and partly from the attraction of the great difference in price between the crude textile dyes and the microscope stains, began to supply the demand. There is no reason to suppose that their output was inferior to the German products. But it varied from manufacturer to manufacturer in its precise qualities. The users got results which were not exactly comparable with those obtained from the Grübler products or with each other. The total demand, moreover, is so small in bulk that it is hardly worth distributing. The situation has given rise here and in America to a desire for the free importation of German bacteriological stains, on the one hand, and, on the other, to fresh efforts to maintain national independence in this branch of scientific work. The Society of American Bacteriologists is endeavoring to secure cooperation in determining on a reliable standard brand of each kind of stain, and in discouraging the marketing of variants. A similar course in this country would be very convenient.—The London *Times*.

SPECIAL ARTICLES

THE SECOND-YEAR RECORD OF BIRDS WHICH DID AND WHICH DID NOT LAY DURING INDIVIDUAL MONTHS OF THE PULLET YEAR

The egg output of the commercial poultry plant is due in part to birds in their first and in part to birds in their second year. At some time during the first year the number of pullets is reduced to the number which is to be retained as hens during the second year.

It would be of obvious advantage if the birds sold from the flock as pullets could be those which if retained would make the poorest record in their second year. If the birds destined to be the highest producers in the second year could be selected on the basis of some criterion recognizable in the first year, it should be possible to raise the average production of the flock as a whole by increasing the average production of the hens.

In the course of a general investigation of the problem of the prediction of the egg production of the domestic fowl from the records of short periods, we have availed ourselves of the opportunity of considering the relationship between first and second year laying activity presented by the data of the Vineland International Egg Laying and Breeding Contest. As one phase of this work[1] we have sought to determine to what extent the simple criterion of *laying* versus *not laying* in any month of the first year may be used

[1] Other phases of the investigations will be reported in detail elsewhere.

in predicting the record of the second year. The criterion has already been considered in relation to the prediction of first year egg record.[2] While our immediate purpose is the consideration of the second year production of birds which did and of those which did not lay during given months of the first year, it seems desirable to give the mean first year productions of these birds as well. For comparison the results deduced from the data

[2] Harris, Blakeslee and Kirkpatrick, *Genetics*, 3: 42–44, 49–56, 1918.

MEAN ANNUAL PRODUCTION FOR FIRST AND SECOND YEAR FOR BIRDS WHICH DID AND WHICH DID NOT LAY DURING INDIVIDUAL MONTHS OF THE FIRST YEAR

Condition of bird in month of first year	Storrs data for first year		Vineland data for first and second year		
	Per cent. of flock	First year annual mean	Per cent. of flock	First year annual mean	Second year annual mean
November					
Not laying	40.6	136.8	19.4	144.5	127.8
Laying	59.4	164.2	80.6	181.2	142.7
Difference		+ 27.4		+ 36.7	+ 14.9
		17.9%		21.1%	10.7%
December					
Not laying	38.0	133.6	22.3	142.3	125.9
Laying	62.0	165.2	77.7	183.2	143.8
Difference		+ 31.6		+ 40.9	+ 17.9
		20.6%		23.9%	12.8%
January					
Not laying	42.5	136.4	20.5	141.6	124.4
Laying	57.5	165.6	79.5	182.4	143.8
Difference		+ 29.2		+ 40.8	+ 19.4
		19.1%		23.4%	13.9%
February					
Not laying	9.9	118.6	5.0	133.6	117.0
Laying	90.1	157.0	95.0	176.2	141.0
Difference		+ 38.4		+ 42.6	+ 24.0
		25.1%		24.5%	17.2%
July					
Not laying	2.3	72.3	3.1	110.6	92.5
Laying	97.7	155.1	96.8	176.1	141.3
Difference		+ 82.8		+ 65.5	+ 48.8
		54.1%		37.6%	34.9%
August					
Not laying	5.1	89.9	7.2	121.6	99.5
Laying	94.9	156.5	92.8	178.1	142.9
Difference		+ 66.6		+ 56.5	+ 43.4
		43.5%		32.5%	31.0%
September					
Not laying	23.0	115.0	33.2	147.8	124.3
Laying	77.0	164.6	66.8	187.1	147.5
Difference		+ 49.6		+ 39.3	+ 23.2
		32.4%		22.6%	16.6%
October					
Not laying	54.7	131.9	63.2	156.9	129.8
Laying	45.3	178.9	36.8	203.5	157.0
Difference		+ 47.0		+ 46.6	+ 27.2
		30.7%		26.8%	19.5%

of the International Egg Laying Contest at Storrs during the year 1913–'14 and 1914–'15 [3] are laid beside those presented here from the Vineland data.

The essential constants appear in the accompanying table. This gives the per cent. of the flock which did and which did not lay during the months of the first year in which any considerable proportion of the birds did not lay. The average annual production for these birds in the first year of both the Storrs (1913–'14 and 1914–'15) and the Vineland (1916–'17) contests and in the second year (1917–'18) of the Vineland contest are shown. While the actual differences in egg production are the data of practical significance, comparison between the three series is facilitated by expressing the differences between these annual means for the birds of the two classes as percentages of the actual annual average productions[4] of the flock.

Considering first the records of the pullet year we note that for the Storrs series the birds which laid in any given month show an average annual (pullet year) egg production of from 27.4 to 82.8 eggs higher than those which did not lay or from 17.9 to 54.1 per cent. For the Vineland series the difference in the production of the two groups ranges from 36.7 to 65.5 eggs or from 21.1 to 37.6 per cent. Thus the difference in the annual egg production of the birds which did and which did not lay in any given month, as well as the percentage of the birds which are not laying, varies greatly according to the month considered. During the months of November, December and January the percentage differences in the annual production of the two groups of birds is higher in the Vineland than in the Storrs series whereas for the other months of the eight considered the reverse is true. The average percentage difference is 30.4 in the Storrs series and 26.6 in the Vineland series.

[3] Harris, Blakeslee and Kirkpatrick, *loc. cit.*, p. 42.

[4] These are 153.19 eggs for the first year at Storrs, 174.05 eggs for the first year at Vineland, and 139.79 eggs for the second year at Vineland.

Thus the constants show conspicuous differences of great practical significance in the first (pullet) year records of birds which did and those which did not lay during the individual months of the first year. The results for the first year records at Storrs and the first year records at Vineland are in fair agreement.

Turning to the second year means we note that for each of the eight months of the first year used as a basis of selection for an increase of second year production, the second year record of birds is higher if they laid during the special month under consideration in the first year than if they did not lay in that month. The differences between the groups amount to about two dozen eggs or more per bird in five of the eight months considered.

It is clear, therefore, that so simple a criterion as laying *vs.* non laying in the first year may furnish a criterion of some value for the selection of the birds to be retained in the flock for breeding and for second year production.

J. Arthur Harris,
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THE AMERICAN CHEMICAL SOCIETY

(continued)

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The rate of drying of solid materials: W. K. Lewis.

The theory of atmospheric evaporation: W. H. Carrier.

The compartment dryer: W. C. Carrier and A. E. Stacey. A discussion of the relative merits of the continuous and compartment dryers.

Direct heat rotary drying apparatus: R. G. Merz. The paper was treated under the following heads: (1) The kinds and characteristics of direct heat rotary dryers. (2) The fields of application of such drying apparatus to the industries where they can be used to advantage. (3) The