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THE SCALE COUNT OF HUMAN HAIR

Joseph Beeman†

In an article which recently appeared in this Journal, Gamble and Kirk¹ listed and statistically analysed their results of the scale counts of thirty-nine samples of human crown hair. They stated: "It seems reasonably definite that a single hair is nearly always representative of all the hairs of the head, provided that enough counts are taken to eliminate the normal variation of scales from point to point along the hair"; and "The scale count mean differs significantly from individual to individual." In their summary they further state: "Both factors (scale count mean and ranges) have a definite and individual value in eliminating suspected hair identities."

In attempting to reproduce their findings, results were obtained which were somewhat at variance with those of the given authors. Seventeen samples of human crown hair were taken from the same area of the head, sixteen random individuals being utilized. The hairs were washed in alcohol-ether and dry mounted beneath a coverslip. Using an 8 mm. objective, the stationary crosspiece of a filar micrometer was aligned in the center of the hair and parallel to the long axis of the hair. The number of scales between two given

Table I

SCALE COUNT OF A SINGLE HUMAN HAIR

Number of Determinations	Scale Count	Average
1	28.6	28.6
5	28.6	30.8
	28.6	24.4
	28.6	28.2
25	26.4	26.4
	28.6	24.2
	26.4	28.6
	26.4	24.2
	24.2	28.6
	24.2	28.6
	28.6	28.6
	28.6	28.6
	28.6	28.6
	26.4	28.6
	26.4	26.4
	26.4	28.6
	24.2	27.0

points on the micrometer was counted. The micrometer was standardized against a stage micrometer, and the number of scales per 0.2 mm. of linear hair length was calculated and used as the "scale count." All observations were made by the author under similar circumstances.²

Table I is the result of the scale count on a single hair utilizing one, five, and

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¹ Gamble, Lucy H. and Kirk, Paul L., "Human Hair Studies II—Scale Counts," J. Crim. L. and Criminology (Pol. Science Sec.) 31 (5): 627 (Jan.-Feb. 1941).

² [Editor's Note. This procedure is comparable to that used by Gamble and Kirk in their study. These authors, however, employed a greater number of hairs per person (at least twenty-five), or in the case of only a single specimen of hair per person, they base their conclusions upon one-hundred counts taken at different points

Table II
SCALE COUNT OF HAIRS FROM SIXTEEN INDIVIDUALS

Sample	Sex	Age	Color	Scale Count Determination ¹					Average Scale Count	Range Scale Count	Variation Scale Count
				A	B	C	D	E			
1	M	30	Blnd	22.0	24.2	24.2	24.2	26.4	24.2	22.0-26.4	4.4
*2	M	30	DkBrn	22.0	24.2	24.2	28.6	30.8	26.0	22.0-30.8	8.8
*3	M	30	DkBrn	24.2	26.4	29.8	35.4	50.5	33.3	24.2-50.5	26.3
4	F	27	Blnd	22.0	24.2	24.2	24.2	26.4	24.2	22.0-26.4	4.4
5	M	35	DkBrn	17.6	19.8	24.2	24.2	28.6	22.9	17.6-28.6	11.0
6	M	58	DkBrnGy	19.8	19.8	22.0	26.4	28.6	23.3	19.8-28.6	8.8
7	F	35	Blnd	19.8	24.2	26.4	26.4	28.6	25.1	19.8-28.6	8.8
8	F	45	RdGy	24.2	24.2	24.2	26.4	28.6	25.5	24.2-28.6	4.4
9	F	27	DkBrn	22.0	22.0	26.4	28.6	28.6	25.5	22.0-28.6	6.6
10	M	55	BlndGy	22.0	22.0	24.2	24.2	28.6	24.2	22.0-28.6	6.6
11	F	25	Blnd	22.0	24.2	24.2	26.8	28.6	25.1	22.0-28.6	6.6
12	M	35	DkBrn	22.0	22.0	24.2	26.4	26.4	24.2	22.0-26.4	4.4
13	M	27	DkBrn	22.0	24.2	24.2	26.4	28.6	25.1	22.0-28.6	6.6
14	M	50	DkBrn	19.8	19.8	24.2	26.4	26.4	23.3	19.8-26.4	6.6
15	M	35	DkBrn	24.2	26.4	26.4	30.8	35.2	28.6	24.2-35.2	11.0
16	M	21	LtBrn	22.0	24.2	24.2	24.2	26.4	24.2	22.0-26.4	4.4
17	F	40	DkBrn	19.8	22.0	22.0	24.2	26.4	22.9	19.8-26.4	6.6

* Case 2 and Case 3 are from the same individual.

¹ A, B, C, D, and E refer to separate hairs from the same individual. The scale count given is the average of five counts on each hair and represents the number of counts per 0.2 mm. lengths of hair.

twenty-five determinations, respectively. The variation in scale count on a single hair would seem to be within the limits of observational error.

Table II is the result of the scale count on five samples of hair taken from each of sixteen individuals. (Samples 2 and 3 were taken from the same individual.) The arithmetical average of five counts per single hair was listed as the scale count for that hair.

The greatest variation in a single individual was 26.3 scales per 0.2 mm. (Case 3), while two individuals had a variation of 11.0 scales per 0.2 mm. The greatest variation between the average scale count of any of the sixteen individuals studied was 10.4 scales per 0.2

mm. (Cases 17 and 5, and Case 3), which would seem to be within the limits for any single individual. In one individual (Cases 2 and 3) the scale counts even ranged from 22.0 to 50.5 scales per 0.2 mm., i.e., 28.5 scales.

On the basis of these observations it is the author's opinion that the scale count of a single human crown hair is neither representative of all the hairs of that individual, nor does the scale count differ significantly from individual to individual. We feel that the value of the scale count in eliminating or "individualizing" an evidence hair with one from the suspect is to be seriously questioned. The scale count of a single given hair appears to be relatively constant.

along the hair. This difference in procedure does not invalidate the findings of the present study. The conclusions of this paper are based on the maximum variation in scale count found in hair

from each individual, and increasing the number of counts per individual would not reduce the amount of variation between maximum and minimum values.]