

## THE MIDLAND INSTITUTE LECTURE.

Last night Mr. Francis Galton, F.R.S., delivered a lecture at the Birmingham and Midland Institute, on "Chance and its Bearing on Heredity." There was a large audience.—Mr. GALTON, by means of numerous diagrams, explained in a lucid and interesting manner the various theories as to "the laws of chance," and illustrated these theories by reference to carefully-compiled statistics of the phenomena of heredity. The conclusions to which Mr. Galton's investigations led, and which were shown to be well verified by fact, were remarkable. They, of course, applied to a population whose general statistical peculiarities did not change sensibly during the generation under discussion. Then it was shown to be possible to calculate all that he had mentioned, and for any degree of kinship, by the help of the four following numerical data—viz.,  $68\frac{1}{4}$  inches,  $34\text{-}10\text{ths}$  of an inch,  $15\text{-}10\text{ths}$  of an inch, and the fraction of 27 divided by 25. The first datum of  $68\frac{1}{4}$  inches was the medium height of the adult male population. So that if any large group of them were taken at haphazard and marshalled in a long class in the order of their statures, then the height of the man who occupied the middle position in the class would always have the height of  $68\frac{1}{4}$  inches. The datum of  $34\text{-}10\text{ths}$  of an inch was the difference that would always be found between the height of the man who stood at quarter of the length of the class, counting from its lower end, and that of the man who stood at quarter of its length counting from its upper end. The datum of  $30\text{-}10\text{ths}$  of an inch was obtained by marshalling the differences in order of their magnitude, that were found between pairs of brothers taken at haphazard, each pair out of a different family. These formed a series of values from which the one that stood at one-fourth of the distance from either end of the class was taken, then the difference between these two values was found to be  $30\text{-}10\text{ths}$  of an inch. Lastly, the fraction meant that in order to transmute the stature of a female to the corresponding male equivalent they must multiply it by 27 and then divide by 25. These four data were all that were required in the application to any special case of the primary law of simple heredity, which the lecturer had deduced. This law was as follows:—He supposed all female statures to have been transmuted to their male equivalents, and the separate influence of each ancestor to have been allowed for. Then the legacy received by the child was on the average an aggregate of ancestral contributions, to which each ancestor contributed a fraction of his own individual "deviation" from the medium stature of  $68\frac{1}{4}$  in. The fractions were as follow:—Each parent contributes one-fourth of his "deviate," each grand-parent  $\frac{1}{16}$ , and so on. In other words, the two parents together contributed  $\frac{1}{4}$ , the four grandparents  $\frac{1}{16}$ , the eight great-grandparents  $\frac{1}{64}$ , &c. The sum of  $\frac{1}{4}$ ,  $\frac{1}{16}$ ,  $\frac{1}{64}$ , and the rest, was equal to 1, so that the whole of the child's heritage was accounted for. The child might vary on his own account, as well as inherit from others, but individual variations did not come under this head; they disappeared in statistical averages. Calculations derived from the above law, which was founded on observations of hereditary stature, were applied to hereditary eye colour, and the results proved to be remarkably accordant with the observed facts. In a large number of families, containing an average of eight children, and none containing less than six, the calculated proportion between the light and the dark eyed children in each family did not differ from the observed proportion by more than 1 child in three-fourths of all the cases. The data used were the eye-colours of the two parents and of the four grandparents, the previous ancestry being unknown. The progressive stages by which the lecturer's theory of heredity had advanced to its present form were published in various memoirs, a collection of which he presented to the Institute; the more important of them being "Typical Laws of Heredity," *Jour. Roy. Inst.*, 1877; "Regression towards Mediocrity in Stature," *Journ. Anthropol. Inst.*, 1885 (this is an illustrated and revised reprint of an address in 1885 to the Anthropological Section of the British Association in Aberdeen); and two Memoirs in *Proc. Royal Soc.*, 1886, on Family Likeness in Stature and in Eye-colour respectively.—The importance of the observations from the national, the social, and the educational points of view was dwelt upon by the lecturer, whose remarks, in spite of their somewhat technical character, were followed with great interest.