

DISCUSSION AND REPORTS.

THE PSYCHOLOGY OF INVENTION.¹

In addition to the various points of view regarding the psychological status of originality which the President's address and the careful analysis and significant tests of Professor Royce have ably presented, certain other aspects of the fundamental problem may be reached by approaching it from still different directions. There is first the anthropological aspect, which would consider originality as a combined racial and social characteristic—the result, as is the case with so many mental capacities, of both nature and nurture. In this way the problem very naturally becomes a portion of the general problem of variation—the distribution of mental powers among men. One of the first attempts to present the laws of distribution of human faculty—that by Mr. Galton in his 'Hereditary Genius'—still remains one of the best. It indicates, however unsatisfactorily, the law-abiding character of mental endowment, and substitutes a well-conceived and measurably definite conception of mental superiority for the much vaguer notions of popular discussion. It enables us, also, to frame our questions with greater precision and significance, even when it does not yield the material for answering them. Applying the conception of distribution according to the degree of differentiation from the average, above and below, to the races, we should expect that races of an inferior degree of average intelligence would present a less varied degree of differentiation than that presented by a race of superior intelligence, that the individuals of such a race would be much more like one another than the individuals of a more developed race, and that persons of special and unusual endowment would be less common among the former than among the latter. Comparisons of the white and negro races, of civilized and savage, are at once suggested, and the evidence seems in favor of the deduction presented above. None the less, differences of life and training are so prominent in these comparisons that adequate and comparable standards of estimation are not easy to find. Yet, as man in a measure fashions his own environment, that environment itself becomes a significant index of his variability.

¹ Discussion before the American Psychological Association, Ithaca, 1897.

Extreme conventionality, rigid habits of thought and unchangeable customs of life would be at once a result of and a means of propagating a lack of variability. An appropriate biological test is the relative extent of the pre-adult or especially adaptable period of life in different races. The cumulative evidence there is quite forcible, and indicates an earlier maturity, both physiologically and psychologically, among the lower races, and this materially lessens the probabilities of divergence from stereotyped standards. It would thus appear that the possibility of being different from one's fellow men, and in such differences of pointing the way to higher and better things, is itself an important anthropological factor in developmental movements. This, in a measure, presents the phylogenetic aspect of originality corresponding to the ontogenetic problem, which aims to discover under what conditions the individual varies most from his average self, particularly in the direction of useful as well as unusual thinking. And the two aspects, owing to the interaction of nature and nurture, are constantly coördinated, and may, therefore, be studied together with advantage to each.

The unusual and the extreme exercise a psychological fascination which does not belong to the contemplation of the commonplace but significant average. The explanation of a man of genius is the attractive problem which the ambitious student, whether of literary or scientific temperament, finds it difficult to resist. The explanation in more than a general way of individual occurrences, when these occurrences are in themselves complex, is possible only in advanced stages of science; and the science of human character which John Stuart Mill and others hoped to establish is as yet unable to solve much simpler problems than this. Genius represents not only an unusual, but a desirable, variation in mental products. Mere eccentricity is frequently excessively unconventional and bizarre; the thought processes of delirium or insanity often present a maximum of originality. Divergence from the average is thus a common property of genius and insanity. Are they alike in other respects, and does their likeness indicate an underlying community of nature, or is it mainly superficial? This vexed problem thus becomes closely related to that of selective thinking and mental variability. The upholders of the essential similarity of genius and insanity point to the many cases in which symptoms characteristic of abnormal states appear at times among great men; they point to hereditary influences and the frequent tainting by mental diseases of the great man's family. The considerations to which the present discussion would attach impor-

tance would be of a different type. Are the mental processes and products of genius similar to the mental processes and products of the insane? Are the periods and the moments of high original activity subject to the same influences in the two cases? It seems likely that a careful inquiry along these lines will contribute something to the better comprehension of the general problem.

While it is convenient and appropriate to certain discussions to consider mental superiority as a general attribute, it must be borne in mind that it most usually appears as a great capacity in one direction; the distribution of the several mental powers within the individual must be considered, as well as the rank or excellence of the aggregate of such powers. Musical genius furnishes good instances of such one-sided endowment, of an overwhelming passion for one form of pursuit. But here, as well as elsewhere, it is pertinent to investigate the more immediate causes and occasions which incited such a great passion to its most successful and most original expressions.

It seems hardly necessary to add that these suggestions are not offered as aids to the solution of the nature and conditions of appearance of original mental states, but merely as memoranda for the general marking out of the field in a preliminary survey.

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THE EXTENDED PURKINJE PHENOMENON (FOR GRAY LIGHTS).

By the Purkinje phenomenon is usually meant the curious fact that blues and especially greens look abnormally bright when the illumination is diminished, and that yellows and especially reds look abnormally dull. The name commends itself as being also a proper designation for the still more curious fact that when the reds and (blue) greens are combined so as to give a colorless mixture, and also the blues and the yellows, these mixtures, if made equally bright for an ordinary illumination, differ very much from each other, and also from an undecomposed colorless light, when the illumination is faint, and that in spite of the fact that, as far as the indiscriminating human eye can make out, they are all three identically the same thing. Tschermak, in a recent paper,¹ does not make use of this term, but it is evidently the right name for the fact, and its use will facilitate the report of Tschermak's observations. It is the Purkinje phenomenon only

¹ Ueber die Bedeutung der Lichtstärke und des Zustandes des Sehorgans für farblose optische Gleichungen. Armin Tschermak, *Pflüg. Archiv*, 70, 297-329.