

## MR. F. GALTON ON GENERIC IMAGES AND AUTOMATIC REPRESENTATION.

Mr. Francis Galton has lately published the results of two original psychological investigations, which are of great interest in themselves and admirable specimens of that kind of positive experimental inquiry to which the phenomena of mind can be subjected in only a less degree than the phenomena of nature. The account of one of his researches is given in a popular form in *The XIXth Century* of March last, under the title of "Psychometric Facts," and with greater precision in *Brain*, Pt. VI., of last July, under the title "Psychometric Experiments". The other is the subject of a paper in *The XIXth Century* of July, entitled "Generic Images". Here Mr. Galton has followed out an earlier line of investigation to which some reference has previously been made in these pages, and a short account of the results to which it has now led him may first be given.

The composite portraits which Mr. Galton sought originally to obtain in illustration of the Types of Human Character (see MIND VIII., p. 573), are now used by him to throw definite light upon what he calls "blended memories," or, after Prof. Huxley, "generic images,"—meaning that class of concepts, arising from the fusion of like *sensible* images, which some German writers are in the habit of distinguishing as the *Allgemeine Vorstellung* from the *Begriff* proper. As Mr. Galton, after long trial, has found, two or more portraits that have many points of likeness in common and especially characteristics of a medium quality rather than such as deviate widely, may, if they are of the same size and taken in the same attitude, be combined into one by converging their images from different magical lanterns on the same screen, or through an arrangement of cameras whereby their images are thrown simultaneously on the same photographic plate, or again with one camera by throwing their images, carefully adjusted, upon the same plate successively (which last process best illustrates the blending of memories). The resulting composite portrait is identical with no one of the components, but comprises them all, each having its own share in the total effect; and it is a full picture, not a mere outline like that which Quetelet was able to draw of the typical man by fixing the average position of points according to the ordinary numerical methods of statistics. Including the features of all its components, however great be their number, it is much more than an average: it is, in fact, the pictorial equivalent of the elaborate statistical tables out of which averages are deduced; while, being blurred something like a damp sketch, it shows in the breadth of the blur the variability of individuals from the central typical forms.

Now nothing, Mr. Galton urges, could better represent what is meant by a generalisation, when the objects generalised are objects of vision and belong to the same typical group—that is to say, with medium characteristics far more frequent than divergent ones; and he finds fault with those who, after Hobbes and Berkeley, have too rashly pronounced all generic representation impossible, because it is impossible to frame any definite representation of objects which

no careful statistician would think of putting together—*e.g.*, a representation of man, as including women and children. It is quite possible, he maintains, to produce a good generic representation, if we take any one of the principal races of man, and confine our portraiture to the adult males, or adult females, or to children whose ages lie between moderate limits. For himself, he always experiences, at the moment when the adjustment of portraits to make a composite is being effected, a quick sense of satisfaction like that felt on the first recognition of a doubtful likeness of any kind; and he is as sure as it is possible to be in the circumstances that there is a true (and not merely metaphorical) analogy between catching the coincidence of two similar portraits optically superposed and catching the coincidence of a visible object with a past impression or a pre-existent general idea.

But though he contends for the analogy, he does not now stand by the opinion he expressed in a memoir read last year to the Anthropological Institute, that the composite portrait exactly represents such a generic image as would be had by a mind endowed with the power of pictorial imagination in an exalted degree. In a succession of many different pictures displayed each for the same brief period, if there should be one single picture displayed fifty times in succession or for fifty times as long as the others, its share in the photographic composite (or in the corresponding case of numerical statistics) would be exactly fifty times as great as any of the others; but the like does not hold of the generic image. The familiar fact that sights on which we have not lingered often leave abiding impressions, while the pictures that hang on the walls before our eyes every day of our lives are not always remembered with vivid distinctness, shows of itself how different is the case of mental imagery. Mr. Galton is now inclined to suppose, upon the strength of experiments not yet far enough advanced for publication, that the relation between the varying periods of exposure and the strength of the corresponding *mental* impression follows the law of Weber; according to which, if it requires a tenfold period of exposure to make a doubly deep impression on the mind, it would require a hundredfold period to make a trebly deep one, and so on. But whatever the precise form of the law, its effect, he maintains, is to prevent generic images from having the same definition and simplicity as the corresponding photographs. The most extreme elements will always leave their traces very visibly, because the medium elements are not present in sufficient number to overpower them. In other words, the effect produced by the huge bulk of ordinary facts is never in proportion to their numbers, and undue consideration is given to all exceptional cases. Then, besides this inevitable defect in the mind's power of forming true generalisations, some of the images in every presumed generic group are sure to be aliens to the genus and to have become associated to the rest by superficial and fallacious resemblances; and, again, the number of pictures blended together is sure to fall far short of the whole store that would be available, if the memory were immeasurably stronger than it is and more ready in its

action. All which implies that the human mind is a most imperfect apparatus for the elaboration of true general ideas; and if there are such defects in its best generic images, much less can trust be reposed in those mere traces of them called "general impressions," that are allowed to govern the majority of our everyday actions as by a prescriptive right beyond all question.

Such are the main points of the paper on "Generic Images," given for the most part in Mr. Galton's own language; to the exclusion, however, of one of his modes of expression which can hardly be justified. When he speaks, as he sometimes does, of a generic image as "a generic portrait stamped on the brain," the phrase is surely misleading: it is not *on the brain* that any portrait is stamped, generic or other. What Mr. Galton seems really to have established is that, just as from coincidence of a number of resembling percepts there may be made to arise a composite percept with a more or less definite character, so a number of similar (representative) images will blend into a compound which, though not so definite as the corresponding composite percept, has still the character of a single image. We do not naturally have the opportunity of blending percepts into one: similar objects are *perceived* by us, in the conditions of our perception, only successively or as standing apart from each other in space. On the other hand, we have in the *concept* a multitude of percepts brought together into a unity quite other than that of a *collection* (whether as actually perceived or as representatively imagined). Now it has always been disputed among psychologists what the precise nature of the conceptual representation is; and while some have not hesitated to assert that the representation is quite definite not only in the case of the less general concepts, such as *man*, but also in the case of all concepts whatever, to the very widest, others, finding it impossible to represent the more general concepts with any definiteness, have been led on to deny the possibility of representing definitely anything but the singular percept. There are no limits, says the one set of theorists, to the mind's power of definite representation: the least amount of similarity amid whatever amount of difference in whatever number of instances may be definitely imagined. There is the strictest limit, says the other set of theorists, to the mind's power of imagining: the least amount of difference amid whatever amount of similarity in even two instances is a bar to any such imagination of the two together as can strictly be called a conception of them. And so the dispute has gone on, each side having partial hold of the truth. There are concepts which there is no possibility of definitely representing and which the mind keeps hold of only by the help of a definite name or sign. On the other hand, there is a kind of image, more or less definite, which in certain circumstances arises in the mind as representative of a number of resembling objects without being exactly representative of any one of them, and which is thus a true concept. This solution of the long-standing dispute has been at times suggested, and Mr. Galton's experiments may now be regarded as providing the positive verification that was wanting to its acceptance.

His artificial composition of actual portraits shows how the mind would deal with a number of similar percepts could they naturally be presented to sense superposed upon one another; and since, in point of fact, the mind has to deal with a number of similar representative images that are, as it were, superposed on one another, it is reasonable to suppose that the result in natural imagination is strictly analogous to the results obtained in Mr. Galton's artificial perception. At the same time the fact, on which he lays so much stress, that the fusion of percepts has its limits—that a certain amount and kind of similarity is required in the portraits for the formation of a composite—clearly indicates that conception does not always take place by way of imagination, or if by imagination then by one so blurred and indefinite that some other means of definition—*e.g.*, the use of names, &c.—is rendered necessary. And what is here said of the mind applies, *mutatis mutandis*, to the brain, which, though it does not take on “portraits,” either in perception or conception, is involved in both of these mental processes and must be supposed to work in a similar fashion in the two cases, so strictly related as they are to one another.

Let us now turn to Mr. Galton's other subject of experiment. Dividing the processes of “thought” into two classes—(1) where “ideas present themselves by association either with some object newly perceived by the senses or with previous ideas;” (2) where “such of the associated ideas are fixed and vivified by the attention as happen to be germane to the topic on which the mind is set”—he confines himself to the first case, where the mental flow of representation is strictly automatic, and his object is to show that it can be rigorously investigated, with the result of laying bare some of the inmost workings of the mind.

The difficulty of the inquiry is that the mental process of representation must be closely watched and yet in no way controlled; and this Mr. Galton surmounted by the following method. Starting from the sight of a number of words, presented one after another, he allowed the mind to play on each for a very brief period till a couple or so of ideas had arisen, each *directly* suggested by the word, and then, turning attention full upon their traces still remaining, he recorded at the time their exact appearance, afterwards collating the records at leisure. This method was a refinement upon an earlier mode of experiment, in which he walked slowly along Pall Mall for a distance of 450 yards, scrutinising attentively every object that caught his eye and dismissing it for another as soon as it had raised a couple of direct representations. Here the record, being made at the end of the whole series, could only be very imperfect, but it was sufficient to show him that the sight of about 300 objects in succession could call up samples of his whole past life, including many bygone incidents which he had never suspected to form part of his stock of thoughts, though they were actually glanced at as objects too familiar to awake the attention. A second trial of the experiment, after a few days, showed however that, strangely active as the mind thus seemed to

be, there was really a very great deal of repetition in the two sets of representation, and thus it became important to devise the other method of experiment, whose results could be submitted to statistical analysis. A selected list of suitable words (carefully dismissed at other times from thought) was gone through by Mr. Galton on four different occasions, at intervals of about a month, in very different circumstances; each word was disclosed to view without the least knowledge what it would be, and as soon as the requisite associates were obtained (always by way of direct suggestion from the word, on which attention was kept firmly fixed while the associates were taken in as by a half glance), they were written down, with the time they occupied (as ascertained by a chronograph started by pressing a spring at the moment of disclosure and stopped by releasing the spring at the close of each experiment). The work was most repugnant and laborious, and could be accomplished only through great self-control; but Mr. Galton says he soon got into the way of performing it all in a very methodical and automatic manner, keeping the mind, "as it were, at full cock and on hair-trigger before displaying the word," and undisturbed when the time for stopping came.

With a list of 75 words, these were the main positive results. 505 ideas were suggested in the course of the four trials, during an aggregate time of 660 seconds—at the rate, therefore, of about 50 a minute (which is much slower than the unbroken flow of representations in reverie). But of the 505 actually suggested, only 289 were different ideas. On presentation of the same word, 29 recurred all the four times (making 116 of the total), 36 three of the times (108), 57 twice (114), and only 167 singly. This, says Mr. Galton, shows much less variety than he expected, and proves that the mind is perpetually travelling over familiar ways without our memory retaining any impression of its excursions; it is apparently always engaged in mumbling over its old stores, and if any one of them is wholly neglected for a while it is apt to be forgotten, perhaps irrecoverably. Nor, as he thinks, is it keen interest and attention, when first observing anything, that fixes it in the memory: we forget the time of trains so carefully studied in *Bradshaw* for a journey, moves at whist, &c., &c. Unless the subject has a continued living interest and is often referred to (consciously or unconsciously), it will, as a general rule, sink beyond recall. There did, in the course of the experiments, come up (under no less than three aspects) one recollection from his boyhood which he thought had entirely lapsed; notwithstanding, he strongly suspects that ideas which have long since ceased to fleet through the brain disappear wholly, and he is no believer in the common notion that things once perceived can never vanish entirely from the memory but that, in the hour of death or under some excitement, every event of a past life may re-appear. The supposed recollection of a whole past life would turn out to be only of a large number of episodes in it, to be reckoned in hundreds or thousands, certainly not in tens of hundreds of thousands. Mr. Galton adds the remark that, as the associated ideas that came up

were mostly unshared experiences of his own, the experiments show *measurably* how impossible it is in a general way for two grown-up persons to lay their minds side by side together in perfect accord: the same sentence cannot produce precisely the same effect on both, and the first quick impression that any given word in it may convey will differ widely in the two minds.

In 124 cases out of 289, Mr. Galton was able to fix the date at which the associated representations became first attached to the words, with the following results. 48 dated from boyhood and youth, 57 from subsequent manhood, and only 19 were of quite recent date. Also it appeared that of the earliest associations no less than a quarter occurred in each of the four trials; of the second class, one-sixth; while of the most recent, not one came up in all the four trials. Hence, says Mr. Galton, we may see the greater fixity of the earlier associations, and might measurably determine the decrease of fixity as the date of the first formation becomes less remote.

Finally, Mr. Galton sought to classify the associated representations in respect of their intrinsic character and to connect this with the different kinds of words employed to start them. The representations fell into three main groups: (1) the imagined sound of words, as in vocal quotations or names of persons; (2) sense-imagery of all kinds, but especially visual; (3) representations of action performed by self or by others, and which might be called "histrionic". The words presented fell also into three groups: (1) such as *abbey*, *aborigines*, *abyss*, representable under some definite image; (2) such as *abasement*, *abhorrence*, *ablution*, admitting of histrionic representation; (3) such as *afternoon*, *ability*, *abnormal*, more abstract in character. Upon a comparison, then, of the one set of groups with the other, it appeared that of the associates of the *abbey* series, 43 per cent. were sense-images, 11 per cent. histrionic, and 46 per cent. verbal (names of persons being here especially numerous). In the *abasement* series, 33 per cent. of the associates were histrionic, 32 per cent. sense-images (merging into the histrionic), 35 per cent. verbal (names of persons here in the minority, as compared with Biblical scraps, family expressions, bits of poetry, &c.). In the *afternoon* series, as many as 53 per cent. of the associates were verbal (with a great preponderance of mere catch-words), the sense-images and histrionic representations being respectively 22 and 25 per cent. Here the preponderance of catch-words, which intruded themselves before the thoughts became defined, shows with what difficulty the meaning of abstractions is realised; and it even happened in 13 cases that the original word presented was so puzzled over that, within the maximum time of four seconds allowed, either nothing at all was suggested or after a first idea the second was too confused and obscure to admit of record. As to the *order* in which the representations arose, the lead was taken by the Histrionic ones whenever they occurred; Verbal associations occurred first and with great quickness on many occasions, but on the whole they were only a little more likely to occur first than second; Imagery was decidedly more likely to come up second than first.

Mr. Galton concludes his account (in *Brain*) of this remarkable investigation as follows :—

“Perhaps the strongest of the impressions left by these experiments regards the multifariousness of the work done by the mind in a state of half-unconsciousness, and the valid reason they afford for believing in the existence of still deeper strata of mental operations, sunk wholly below the level of consciousness, which may account for such mental phenomena as cannot otherwise be explained. We gain an insight by these experiments into the marvellous number and nimbleness of our mental associations, and we also learn that they are very far indeed from being infinite in their variety. We find that our working stock of ideas is narrowly limited, but that the mind continually recurs to them in conducting its operations ; therefore its tracks necessarily become more defined and its flexibility diminished as age advances.”

It is to be hoped that Mr. Galton will continue to work in a vein which his psychological tact renders so fruitful of results. EDITOR.

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#### THE SO-CALLED IDEALISM OF KANT.

In a note with the above title in the last number of *MIND*, Mr. Henry Sidgwick makes some criticisms on a passage in my reply to Mr. Balfour (*MIND* XIII.) ; Mr. Sidgwick has, however, misunderstood what I said, partly, perhaps, from the too great brevity with which I expressed myself ; but partly also, I think, from his not attending sufficiently to the context of the passage which he quotes.

Mr. Sidgwick gives the following re-statement of my views :—

“I understand Mr. Caird to affirm (1) that Kant held a doctrine which may properly be called Idealism, because he regarded the question whether or not there is an existence of things-in-themselves independent of our perception of them as ‘meaningless ;’ and (2) that in his ‘Refutation of Idealism,’ he substituted for this the question whether or not we have an explicit consciousness of objects in space outside our bodies prior to the explicit consciousness of self as an object.”

On this I have to remark, (1) That I did not call Kant an Idealist because of his doctrine in relation to things-in-themselves: on the contrary (as I have shown at great length in my book), I consider that doctrine the main point in which his Idealism is incomplete. Still, I think it is quite fair to contrast Kant’s philosophy as Idealism with the so-called Idealism of Berkeley, which should rather, I think, be called an undeveloped Sensationalism. (2) As I do not deny that Kant held the doctrine of the existence of things-in-themselves, I could not possibly say that, in every point of view, the problem whether they exist or not was to him unmeaning (though of course I hold that the legitimate result of his transcendental method is to do away with them). But what I meant to say, in the passage quoted by Mr. Sidgwick, was, that the idea of transcendently deducing the existence of things-in-themselves as objects of experience, in the same manner as he attempts in the ‘Refutation of Idealism’ to deduce the existence of phenomenal objects in space, would have been, for Kant, unmeaning. And for this, I think I can bring Kant’s own words in evidence. (3) I said nothing about the “con-