M I N D

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OF

PSYCHOLOGY AND PHILOSOPHY.

I.—COMPARISON.

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THERE has been a tendency in English psychology to undervalue the active side of intellection. The predominance of the doctrine of Association is favourable to the view that thinking is in the main a mere succession of representations determined by conditions lying outside consciousness, and in which the mind is wholly passive. And the manner of regarding all mental products as brought about by the realisation of certain nervous conditions, which naturally attaches itself to the associational view of the mental life, serves still more, perhaps, to fix the psychological habit of treating mental processes as purely passive, mechanically determined events. This tendency appears to me to show itself in a marked way in the common expositions of the nature of the higher intellectual processes, known as thinking. Thus we find that the combination of similar psychical elements is spoken of as though it were merely automatic assimilation, that is to say, the suggestion by one element of its analogue or analogues in our preceding experience. And, more significant still perhaps, we hear of intellect being resolved into relations between feelings, just as though psychical elements somehow found out their

proper correlates and classified themselves with no aid from the mind itself working under the form of conscious mental activity.

We must, I suspect, seek again to make prominent this idea of mental activity. The absolute distinction between active agent and passive subject has long been abandoned in the physical world. The stone that is struck by the hammer is put into a state of intense activity, a mode of activity determined not so much by the hammer as the nature of the stone itself; or to put it otherwise, the stone is a re-agent in relation to the agent, the hammer. And it is even more evident that the mind reacts on the physical stimuli which we call the conditions of its phenomena. By speaking of such mental activity we do not commit ourselves to any extra-scientific hypothesis of an occult active spiritual principle. We mean, in good faith, simply a phenomenal activity, an activity which is a distinguishable ingredient of our conscious mental life, varying greatly at different times. In its higher form it is volitional exertion, the putting forth of mental energy in the form of resolute concentration, but activity enters into all intellection in different degrees. It shows itself in the holding of a presentation before the mind, or the narrowing of consciousness upon such a presentation, and in the steady fixation of a representation from the instant at which it begins to emerge in the dim region of sub-consciousness; and it manifests itself in a yet higher or fuller form in all relational thought. To view things as related, to bring different mental contents into relation one with another,—this is emphatically the work of the mind: it is that part of the mind's elaboration of the materials supplied by sense which most clearly shows it to be the outcome of will.

In the following paper an attempt will be made to contribute towards this rehabilitation of the volitional factor in thought by an examination into the nature of its most fundamental operation, that of Comparison. The term Comparison may be roughly defined as that act of the mind by which it concentrates attention on two mental contents in such a way as to ascertain their relation of similarity or dissimilarity. By a mental content is meant either a presentation or a representation. We may compare two presentations, a presentation with a representation, or two representations. With respect to the two relations here named, it is allowed that they are the most simple and comprehensive, and what we call comparison is plainly the relational function as employed about these.

This definition of Comparison seems to imply that two contents may be presented to the mind and their relation of similarity or dissimilarity not apprehended. It suggests that we fix attention on the two in order to discern their relation, and this is, I think, in a sense indisputable. We often compare two impressions, say colours or timbres, without at the outset knowing how they are related as to difference and agreement;¹ and in many other cases where a likeness or unlikeness has in a measure impressed itself on the mind, we are quite unaware of the precise nature of the relation till we mentally fixate the two and perform the process of comparison.²

Next, we may try to distinguish comparison from passive and sub-conscious discrimination and assimilation. Sir W. Hamilton and Prof. Bain agree in saying that a mode of discrimination enters into all perception. Thus, if I look at a particular flower in my garden, I implicitly mark it off not only locally but also qualitatively from surrounding objects.³ But such sub-conscious discrimination, in which no special relation of the flower to some one of its local concomitants is distinctly apprehended, is not the result of an act of comparison in the full sense of the term. Or take the implicit discrimination of a present from a past impression. In cognising a pear by its taste, I virtually distinguish this from other tastes, as of apples, &c. But this may mean nothing more than that I am differently affected by these tastes when they occur, and not that I now distinctly recall these tastes and represent them in their relation to the present impression. In truth, the variety and intricate network of relations here involved, as in the case of the discrimination of an object from its local surroundings, exclude the possibility of such a distinct relational act of mind.

It is much the same, *mutatis mutandis*, with respect to sub-conscious assimilation. The identification of a familiar

¹ Of course it is necessary in order to have them as two distinct presentations that we vaguely discern a difference between them.

² It is not necessary here to discuss the question recently dealt with by Prof. Stumpf in criticism of Lotze, whether the mind imposes relations on things or rather finds them in the things. The latter assumption seems to be the proper one for the psychologist. It is a real objection to the otherwise useful terms 'relate,' 'bring into relation,' that they seem to go beyond the psychological point of view, suggesting a particular metaphysical theory respecting the rationale of cognition.

³ I assume here, in spite of Prof. Stumpf's recent ingenious argument, that in all perception there is apprehension of relation more or less complex and more or less distinct. The idea of apprehending any content in absolute isolation from other contents seems to me quite unintelligible.

object, as a face or a rose, does not necessarily involve a distinct representation of past impressions. Here, again, we see that the terms of the relations implied answering to all previous like impressions are too numerous to be simultaneously apprehended. I cannot identify the face I see to-day as the same I saw at such a place last week, at another place at another time, and so on; still less apprehend such relations of the rose to all previously seen roses.

This passive and sub-conscious relating of a present to past impressions though not the same process as comparison proper is one of the most frequent preliminaries to it. Indeed here, as in the case of simultaneous presentations, the state of vague chaotic relating tends to pass into distinct orderly relating. Thus, taking assimilation first, if on tasting a wine and taking it for the instant to be claret I let my mind linger on the impression and feel a doubt as to the correctness of the assimilation, I find myself trying to call up a distinct image of claret based on previous experiences, and to make use of this as a standard with which I compare the presentation of the moment. At the same time, I very probably recall the taste of Burgundy or other wines, and consciously compare the taste with these.¹

It is evident, then, that comparison is an act of attention or concentration of a particular sort. We fix our mind on the presentation (or representation) by an exercise of will. But it is an act of attention of a very special kind. To begin with, it differs from attention to a single presentation in its comprehensiveness. In comparing, the mind has to embrace two presentations in one glance: in other words there is a co-fixation of attention on two things as two. At the same time we are not merely apprehending them together as two simultaneously presented objects. I can look at two adjacent stars as two, as lying side by side, without comparing them in the sense of inspecting their relation of similarity or dissimilarity. In order to compare them I must fix the attention on each in a peculiar manner so that its characteristic quality (colour, degree of brightness) may exercise its maximum effect, and thus the real similarity or dissimilarity of the two become apparent.²

A word or two about the relations here singled out,

¹ It is to be remarked that this relating of a present impression to past and not immediately antecedent ones, whether by way of similarity or difference, is always effected by the suggestive forces of similarity.

² It is commonly argued, *e.g.*, by Hamilton and Lotze, that comparing and relating different contents necessitates a perfectly simultaneous attention to these, as distinguished from a rapid transition of mind from one to

namely, Likeness and Difference. I assume that we have to do with two fundamentally distinct relations, and not merely with one. The apprehension of a similarity between two presentations is a different intellectual act from that of a difference. The existence of two perfectly distinct words — 'like' or 'similar' *v.* 'different,' 'ähnlich' *v.* 'verschieden' — points to this conclusion. We are differently affected, or, as Lotze would say, are put in a different frame of mind, by the presentation of a likeness and by that of a difference. And it seems impossible to regard either as a more fundamental mode of consciousness than the other.¹

But though likeness and difference are two distinct co-ordinate and equally positive relations, they are obviously connected one with another. We ordinarily describe them as opposite relations; but it is not at once perfectly clear in what precise manner they are opposed. Given two simple presentations, A and B, does the detection of difference always and necessarily exclude that of likeness, and *vice versa*?

The answer to this question will depend on our conception of the nature of similarity. According to the quasi-mathematical manner of envisaging this relation by the Herbartians, the two simple fundamental relations are perfect similarity (that is, identity or equality) and inequality (Gleichheit and Ungleichheit). So long as we have to do with perfectly simple contents, say two colours, the only possible relation is either identity or non-identity (difference). And the perception of the one *ipso facto* excludes any possible detection of the other. According to this view what we ordinarily call similarity, say, that between two faces, is a case of partial identity, and the apprehension of it is a complex act—the detection of identity amid diversity.

This doctrine has recently been criticised very effectively by Prof. Stumpf.² He argues that the intellectual act of comparison is not a mathematical process of measurement. Similarity and not identity is the fundamental relation, and identity or equality is merely the extreme case of similarity. Moreover, in the case of simple contents, impressions of

the other. It would perhaps be more exact to say that, in fixating one of the presentations, the mind must at the same moment retain and hold fast the other *in a representative form*.

¹ Mr. Spencer's way of describing the relation of likeness as "two relations of unlikeness which neutralise one another" (*Principles of Psychology*, ii. § 373), seems to me open to criticism as seeming to deny to the perception of likeness co-ordinate rank with that of difference.

² *Tonpsychologie*, i. 111, ff.

colour, tone, &c., the apprehension of similarity plays a part. Two colours, say, yellow and orange, are neither absolutely identical nor absolutely different: they may be seen to resemble one another in a certain measure.

It follows from this view that even in the case of the same simple contents both likeness and difference may present themselves together. In other words, the apprehension of likeness does not logically exclude that of difference. Thus I may view two musical qualities or timbres, say those of a violin and viola, as related both by way of likeness and difference. And this double possibility is still more apparent in the case of complex presentations. For here we have a number of distinct elements any one of which in one content may enter into a relation with a corresponding element in the other content. Thus in two voices we may note a similarity of timbre with a difference of pitch, loudness, &c.

It will be plain from the foregoing that though both likeness and difference are potentially present in the same contents, the mind cannot simultaneously grasp the two relations with equal distinctness. This is obvious enough in the case of simple contents. As long as I am thinking of two colours or two timbres as like one another, I am abstracting or turning my attention away from their difference, and conversely.¹ It is like looking at the convex and concave side of a cast, which, though conjoined, can only be perceived successively.

In the case of two complex presentations the truth of the assertion is less apparent. Do I not in comparing two faces or two hand-writings and apprehending a resemblance intuitively it *in the midst of* difference? Certainly. The difference in this case is throughout indistinctly present to the mind, forming a penumbra about the central luminous circle of likeness. But the two modes of apprehension do not at any instant rise into distinct consciousness together. We specially attend now to the one, now to the other, and are distinctly aware of the difference of mental attitude or frame of mind in the two cases.

I have so far been considering what may be called intermediate cases in which both difference and likeness are potentially present. It must be added, however, that there are two extreme cases. (1) On the one hand all difference may disappear in perfect identity, as in comparing two

¹ To assert the opposite would be to return to the Herbartian position that likeness is distinctly intuited as *partial* identity.

colours which are to us indistinguishable.¹ Even here, however, there must be either local or temporal difference in order that there may be two presentations and so an act of comparison at all. And it may be maintained that this separation of two impressions as locally or temporarily distinct is the preliminary stage in all comparison. (2) On the other hand, all likeness may become evanescent, and the two presentations stand over against one another as absolutely disparate and incapable of being assimilated. This case is realised in the attempt to assimilate two perfectly heterogeneous sensations, say, a taste and a colour, under a qualitative resemblance. But here, it is to be noticed, comparison, as ordinarily understood, fails altogether. Difference is not only preponderant and triumphant, but its triumph is fatal to the relational act itself. It is only when the two mutually repugnant elements are seen to present some common feature or aspect (*e.g.*, intensity of sensation, *Gefühlston*, &c.) that we are, strictly speaking, able to compare them, that is, view them as terms of a relation.

And here we have a new light thrown on the process of comparison. As the etymology of the word (to some extent at least) suggests, the process has in a peculiar way to do with the apprehension of likeness. While a faint consciousness of difference constitutes the starting-point in the operation, the consciousness of similarity, in the shape of a common factor, always forms the next step, and the beginning of the act of *comparison* proper. To compare is to view two things as like or unlike in some definite respect, and unless this common ground or *fundamentum* of the relational act is distinctly seized, the whole process remains indistinct and imperfect.²

We may sum up our results with respect to the relations of likeness and difference as follows: Every act of comparison may be said to include both an apprehension of difference and one of likeness, as subordinate moments at least. At the same time, the outlook and aim of the comparative act always has to do with one relation rather than with the other. We compare two contents in order ultimately to see how, wherein or to what extent, they resemble or differ

¹ We are not concerned here with the fact emphasised by Stumpf that considered objectively there must always be some difference, though this may fall short of our power of discrimination.

² It follows that all comparing of complex objects is in a sense abstracting. We only view two presentations as comparable when we more or less distinctly apprehend and pick out for separate circumscribed attention a common connecting feature.

from one another. In some cases we distinctly make up our minds beforehand which relation we will look for ; in others we rather wait to have our minds impressed by the one which proves to be the more powerful ; and this double point of view may be taken up by two minds, and even by the same mind at different times, with respect to the same two contents.¹

By help of this analysis of the act of Comparison we may move on to consider the conditions which govern the process ; and here we may begin with a brief reference to the most general conditions which are applicable to all cases alike. After these have been specified, we may refer to the circumstances which favour particular forms of the comparative act—comparison with a view to difference, comparison with a view to likeness, &c.

The general conditions may be divided into *objective*, or those involved in the nature or concomitants of the presentations considered as external objects, or objects of common perception, and *subjective*, or those connected with the nature of the individual mind.

(1) *Objective Conditions*. The most important of these are reducible to three heads. (*a*) Strength or intensity of the presentations ; (*b*) Presence of a distinct ground of comparison or common factor ; and (*c*) Juxtaposition in time and space. A word or two on each of these may suffice.

(*a*) It is obvious that if we are to compare two contents, these must present themselves with a measure of force and vividness. We cannot compare the pitch of two tones if these fall below a certain degree of strength. There is a certain moderate intensity of impression which is most favourable to comparison. We detect the finest difference of brightness in the median region of the scale of luminosity.² The difficulty of comparing representations as contrasted with presentations illustrates the same truth, for our images are as a rule too faint for clear, steady comparison.

(*b*) As remarked above, all comparison presupposes a *fundamentum*, a common aspect. And the difficulty of comparison varies inversely with the distinctness and promi-

¹ From this it appears that comparison stands in the most intimate connexion with judgment, or decision respecting the relation of two things : comparison is the process, judgment the result. And, since we only know that a process is well performed when the result is good, it will be necessary in estimating the conditions of comparison to treat it as practically synonymous with reaching a judgment.

² The same thing is known to hold good of the median region of tones.

nence of this element. Thus, to take an obvious instance, we cannot compare two tones in respect of pitch if this is unsteady and variable from moment to moment, or two colours if they are not pure. Again, speaking generally, it is more difficult to compare two colours with reference to degree of saturation than with reference to their hue: the element of depth or saturation is less obvious than that of hue. In comparing any two complex contents there is a further difficulty due to the preliminary analysis, the discrimination and selection of the ground of comparison,¹ and the difficulty varies inversely with the prominence of this element. By prominence, is here meant its conspicuousness relatively to the number and strength of the other elements. Thus it is difficult to compare two faces in respect of some quite special feature, say, an expressional movement. Again, the more abstract the point selected the more difficult the comparison. Thus it requires a considerable effort to compare two faces with respect to some element of proportion. The comparison of impressions with reference to the more subtle emotional effects which enter into art-criticism is a matter of special difficulty for the same reason. To compare two pictures in point of 'tone,' or two literary styles in point of purity or dignity, involves a serious effort of abstraction.

(c) The presentations must be capable of being brought before the mind in the way most favourable to comparison. With respect to temporal conditions, it might at first be supposed that the simultaneous presentation of two impressions is preferable to the successive presentation. But though the simultaneous presentation, say, of two tones, brings certain advantages with it, it has disadvantages as well. Thus Fechner found that two weights lifted by the right and the left arm were compared better in succession than contemporaneously. And where, as in the case of tastes, simultaneous impressions are apt to coalesce, sequence is obviously preferable. With respect to impressions presented in space, a certain local contiguity is necessary. Two colours or forms can only be well compared when they are brought near one another. The finest discrimination of hues shows itself with respect to those laid side by side, and at their common boundary, and the same holds good of form-elements, as the direction or length of two lines.

¹ Strictly speaking the so-called simple contents offer a certain choice of relational aspect. Thus two tones may be compared in respect either of pitch, loudness or timbre.

(2) *Subjective Conditions.* (a) Since comparison is a mode of intellectual activity involving voluntary attention and concentration of mind, it obviously presupposes the conditions necessary to such concentration. Thus it implies a well-practised faculty of mental concentration, a power of turning the attention resolutely away from what is irrelevant to the matter in hand. Since, moreover, comparison is a special mode of concentration, *viz.*, a viewing of two things under some relation, it depends on previous practice in this particular line of activity. It has been found that the power of discriminating sensations improves rapidly up to a certain point by practice. Further, the comparison of two contents obviously presupposes a favourable state of mind at the time, a vigorous condition of brain, and the absence of excitement or preoccupation.

(b) In the second place, the act of comparison varies with the pre-existing attitude of mind with respect to the contents selected and the ground of comparison. In the case of simple sensuous contents, that is to say, sensations, much will obviously depend on the individual's special degree of sensibility in relation to the class of impressions. A good discriminative eye for colour, and a vivid interest in colours (which may be supposed in general to accompany this) are clearly a condition of a nice comparison of colours. In the case of complex presentations our facility in comparing will vary directly with our special familiarity with and interest in the ground of comparison, and inversely as the attractive force of the other elements. This is seen in the case of contents so simple as tones. Stumpf has found that the readiness of musicians in comparing tones in respect of pitch was seriously interfered with by the tendency to attend to their melodic relation. Another illustration is the difficulty of comparing the complexion or form of the faces of two intimate friends. Here the mass of individualising isolating suggestions is too interesting to allow of an easy abstract attention to colour or form. The difficulty of a far-reaching abstract mode of comparison increases with a practical detailed acquaintance with concrete things, which tends to divide them by a compact mass of heterogeneous association.

(c) A word must be added on the effect of mental preparation or preadjustment of mental vision. It is evident that when we are definitely on the look-out for a certain kind of similarity or difference, the act of comparison will be facilitated. In this case we are saved the labour of analysis and of selecting the ground of comparison. Thus if I am asked

to compare two flowers with respect to depth of colour or delicacy of texture, the whole process is shortened by the preliminary act of adjustment.

It is another question, however, whether a distinct anticipation of a particular difference or a particular similarity favours the detection of this. Does it follow that because I expect to find a likeness I am more likely to apprehend it? Certainly not. At first sight, indeed, the rule would rather seem to be the other way. To give an instance, two persons visited the United States, one expecting to see the people very like the English in ideas, sentiments, manners, &c., the other expecting to find them unlike. The first was struck by the contrast, the second by the degree of similarity. The explanation of such familiar facts is very simple. It is the unexpected that strikes us. When therefore we are on the look-out for difference, any point of likeness which presents itself gains in force relatively to points of difference by reason of its unexpectedness. And this principle serves to counteract and often to disguise the effect of the tendency to see what we come prepared to see.

These seem to be the main subjective circumstances which serve to determine the rapidity and accuracy of the comparative act. It is only necessary to add that, whenever the comparison is between a presentation and a representation or between two representations, an important subjective factor is the individual power of reproductive imagination. In judging of the pitch of a note, of the weight of a letter, of the genuineness of a picture, and so forth, all depends on the reproduction of the past impression which serves here as the standard of comparison.

We may now pass to the particular varieties of the comparative act and their special conditions.

The process of Comparison may be said to assume one of two broadly contrasted forms according as the mind is or is not specially bent on detecting one particular relation. Where we view two objects with the distinct purpose of noting a similarity, or relating them by way of similarity, the process may be called *Determinate Comparison*. Similarly with the case of looking out for a difference. When, however, the mind compares objects indifferently without special reference either to likeness or to difference, the process may be styled *Indeterminate Comparison*.

Of these two modes of comparison we may best begin with *Determinate Comparison*, and first in its discriminative form.

Determinate Comparison : i. Discriminative.

The detection of differences is in general facilitated by certain circumstances, to which reference may at once be made ; these special conditions being, again, divisible into *objective* and *subjective*.

(1) It is evident that the apprehension of difference will be aided by everything in the presentation which adds to the force or impressiveness of the difference presented. Thus a great difference, a strong contrast, is detected much more readily than a fine shade of difference. Besides the degree or depth of difference, we have, in the case of complex presentations, a second circumstance, namely, the extent, that is to say the number of points of difference which manifest themselves. We more readily pronounce two faces, two tunes, two pictorial styles different when they show a number of unlikenesses. It may not be superfluous to add here that, since in viewing two objects there is always a rivalry between the points of similarity and dissimilarity presented (somewhat analogous to the optical phenomenon known as the rivalry of the fields of vision), the effectual force of any given amount of difference will depend on the ratio of this difference, estimated as a product of intensity and extent, to that of likeness. Where this is small, the detection of difference is difficult and slow, and this difficulty increases rapidly when the ratio falls below a certain fraction ; as in the familiar case of an unpractised observer with very similar individual objects as sheep.¹

(2) Coming now to subjective conditions, we have first to ask whether, in each individual, there is a special strength of discriminative power in general, independent of that of the individual's assimilative power. Such an endowment, if shown to exist, would clearly constitute the most important subjective factor in the apprehension of differences. It seems to me, however, that we cannot safely assume this to be the case. Given, it may be argued, at the outset a good power of comparing, then difference ought, *a priori*, to be just as susceptible of apprehension as similarity and not more so. To this *a priori* argument there may, no doubt, be opposed the *a posteriori* one that observation proves well-marked inequalities in individuals in this respect, some minds being throughout, that is in relation to all varieties of presentation, more readily detective of differences than others. I believe this to be a fact. It may, however, possibly be accounted for by

¹ This fact of rivalry, though needing to be just referred to here, will be illustrated more fully in the case of Indeterminate Comparison.

saying that to certain individuals difference is more interesting than similarity. As has been observed, the two relations affect us quite differently, and it is not improbable that some minds are more sensitive to one of these effects than to the other. And such a superiority of interest, by fixing the attention in this particular direction, would, it is evident, serve to beget a special readiness in detecting differences. The greater the amount of practice in noting dissimilarities, the better the "faculty of discrimination". We may thus provisionally speak of a "special disposition" to note difference, leaving open the question whether this implies a high degree of native discriminative power in general.

The case is much clearer when we consider the discriminative function exercised on any special class of impressions. It is a matter of everyday observation and has been confirmed by scientific research that individuals vary greatly in their "discriminative sensibility" to colour, pitch, &c. These inequalities, measured by the minimum difference appreciated, are due to a considerable extent to special physiological conditions in the sense-organ concerned. Even here, however, practice plays a considerable part. By an habitual concentration of mind on colours or tastes, the power of discriminating them may be greatly improved.

Another question needing to be touched on here is whether a fine discriminative sensibility (as measured by smallest possible difference) implies a uniform intensification of the degree of difference for all intervals in the scale of sensations. Thus, does a given chromatic distance, say, between a yellowish and a bluish green, stand for a more powerful stimulus to the discriminative faculty of one having a fairly discriminative eye than of one near the confines of colour-blindness? It seems reasonable to suppose that this is so.¹

With this general account of the circumstances favourable to discriminative comparison, we may proceed to consider the more important varieties of the problem, and in distinguishing between these we may best of all, perhaps, conceive of the act of discriminative comparison as called forth in response to particular questions.

Prob. I. The first and most obvious form of such question is this: *Are these two simple qualities, colours, tones, &c., different from one another?* or, *Are these two lights or*

¹ This does not imply that in appreciating any amount of difference the mind travels over all the intermediate gradations or distinctly represents the minimum difference (see Stumpf, *Tonpsychologie*, i. 128, ff.).

sounds unequal in intensity? This form of inquiry, as all are aware, has been followed out methodically in order to ascertain the average limits of discriminative sensibility with respect to intensity and quality of sensation. Its application to the measurement of individual differences has not yet been carried out on a large scale.

The individual discriminative ability as thus tested in any particular region of sensation, may be regarded as compounded of two main factors: (a) structural peculiarities of the organ favouring distinguishableness of impressions; and (b) special comparative power, the result of practice, both generally and more particularly in the special domain of impressions concerned, &c. The separation of these factors in any given individual would be a difficult matter at best, and could only be attempted after a systematic examination of the discriminative power in all regions of sensation.¹

Prob. II. A somewhat different problem faces us in the question: *In what way do these two single contents or elements differ from one another?* This question can be asked with regard to sensuous qualities in so far as they form a series or scale. Thus we may be asked, "Which of two notes of similar pitch is the higher?" "Which of two colours is the warmer or the more saturated?" "Which of two oblique lines is nearer the vertical?" and so forth; and it is evident that in respect of intensity and quantity generally the question can always be asked of two magnitudes "Which is the greater?" A great deal of everyday comparison is concerned with solving this kind of problem: *e.g.*, "Which of these voices is the sweeter?" "Which of this author's works is the more original?"²

At first it might be supposed that this second question is virtually answered when the first is answered. But this is not so. It is one thing to distinguish two colours, another to define their difference by reference to a scale. Stumpf found that the subjects with whom he experimented could in certain cases distinguish two tones as to pitch, without at the same instant being able to say which was the higher. This last decision involves a further stage of the comparative act, and one requiring an appreciable interval of time.

¹The complexity of the problem is well brought out by Prof. Stumpf, *Tonpsychologie*, i., §§ 2, 3, and 15.

²It is evident that this form of question can always be put when there is a series of elements, whether qualities or intensities, consisting of at least three terms. Hence it applies to colours, tones and elements of form. On the other hand, if all tastes are resolvable into antithetic pairs we cannot have a qualitative series of tastes.

To recognise one note as higher than another, or one colour as warmer than another, is plainly to classify a difference, or more correctly to identify the mode or direction of their dissimilarity; and facility in accomplishing this depends, not on discriminative but on assimilative ability, and on previous familiarity with the particular relation (high and low, warm and cold), and so with the scale as a scale, or as Stumpf calls it a *Steigerung*.

In the first two Problems we have had to do with simple contents. We now pass to others which have to do with complex presentations. Here, as might be expected, there is more complexity, more range for the movements of attention; and, in general, the process is more lengthy.¹

Prob. III. Of such problems the first is the following: *Are these two complexes different in any respect?* This question would, it is obvious, be asked with respect to individual objects very similar to one another, e.g., two sheep, two flowers, an original painting and a copy. Here the distinct separation of the point (or points) of difference is not necessary. All that is needed is a vague apprehension of some dissimilarity, though we are not yet in the position to distinctly localise this.

Here rapidity of the discriminative act will plainly depend largely on special interest in difference as opposed to likeness. The preponderating points of similarity tend in this case to thrust themselves on the attention, and to keep the faint and inconspicuous point of difference out of sight. We note, too, in this case the effect of special familiarity with and interest in the particular point of difference presented, leading to a keenness of mental vision in relation to it. Instance the shepherd's discrimination of two sheep, or the art-connoisseur's discrimination of the clever copy from the original. It is to be added that slight differences come in a manner to be increased by experience and association which invests them with a special significance. The small points that differentiate one horse from another in the eyes of the connoisseur are specially interesting and impressive to him because pregnant with practical meaning.

Prob. IV. The remaining problem is supplementary to the last (as Prob. II. was to Prob. I.): *In what particular (or particulars) do these two complex contents differ from one*

¹ Of course even in the case of complex presentations the problem may be a narrow and circumscribed one, as when we are asked to decide whether two faces differ in complexion. But this case differs so slightly from Prob. I. that it does not need to be specially considered.

another? Here we have to define a difference already known to be present by assigning to it its exact seat. And this is, in many cases at least, a very material addition to the task of discriminating. We are often vaguely aware of a difference, *e.g.*, between two voices, handwritings, artistic styles, without being able to put our mental finger, so to speak, on the precise point (or points). This involves a careful review of the various constituents which offer possible grounds of comparison, and a selection of the one in respect of which the difference discloses itself. Here the chief conditions are skill and readiness in analysis, and previous practice in making the particular element a matter of separate consideration. The trained critic easily tells you where the difference between one artistic style and another lies, because his mind has been exercised in analysing styles, and separately considering their constituent factors.

We may now pass to a consideration of the other direction of the process of comparison, namely, the detection of resemblance among presentations.

Determinate Comparison: ii. Assimilative.

Here, again, it is evident that the process will in general be furthered by certain *objective* and *subjective* conditions. With respect to the former, it may be observed, as in the case of detecting difference, that the greater the degree of similarity between two contents, the more likely are we to note it. If two closely related hues, forming contiguous elements of the spectrum, are simultaneously presented to the eye, say in a costume, they are at once regarded as similar to one another, provided there is no special reason at the moment to consider them as differing; and again, in the case of complex presentations, the number of points of similarity, or the area over which it extends, will help to determine its force, just as in the case of difference. Two faces, two melodies, two stories in which there is a number of palpable similarities, are much more likely to be assimilated than two in which there is a much more limited extent of resemblance. Finally, in this case, too, we have to consider as a negative condition the absence of striking differences. As every teacher knows, the first tentatives in abstract assimilation require a toning down and repression of difference. A young child would find it hard to compare two flowers as to their common features if examples widely unlike as to size, shape and colour were the first selected.

With respect to subjective conditions, it is merely necessary to add that the detection of similarity is aided by

a strong interest in this relation compared with that of difference. Minds that take a keen pleasure in assimilating things, faces, natural scenes, voices, and so on, and are relatively wanting in the feeling for difference and contrast, will in general note points of similarity more readily, that is under less favourable objective conditions, than others.

We will now take up some special problems, as in the case of discriminative comparison.

Prob. I. : *Do these two simple contents resemble one another?*

At first sight, such a question may seem unnecessary, but a little consideration will show how it may arise. Thus a person may be asked whether he regards, or can regard, two colours at a certain distance from one another in the chromatic circle, say, vermilion and yellow, as like one another. The same question might be put with respect to tastes, odours, timbres, &c. The object of this inquiry would be to determine the limit of the individual's assimilative grasp.

It appears to me that the main circumstance specially affecting this problem is the extent to which past experience has induced a habit of separating the two impressions or qualities as unlike. This may range from zero up to a high figure. A savage or a child who had not distinguished blue and violet or orange and yellow would, it is obvious, necessarily view them as like one another. The more finely the several gradations of colour had been discriminated, the greater the difficulty of assimilating the terms in the series. Thus a painter or a colour-manufacturer would have more resistance to overcome than an ordinary person in regarding, say, violet and blue or violet and purple as similar qualities; while the painter's experience, by familiarising him with the different effects of the individual colours, would tend to make such assimilation still more difficult.

One other consideration bearing on this case may be just touched on. All such assimilation of the terms of a series may be said to imply a vague reference to the whole extent of the series. Yellow and orange are only seen to resemble one another when they are assigned their place in the chromatic scale, and when consequently their common unlikeness to more distant members of the series, say the blues, is dimly discerned. Hence everything which tends to contract the scale by striking out the more distant regions, would serve to increase the difficulty of such assimilations. Thus a man who was specially occupied with a restricted class of tastes, say, those of wines, would, it may be presumed, find it harder than an ordinary person to assimilate unlike vinous flavours, as his habitual range of

reference would be so narrow a one. It would be interesting to know whether the colour-blind find it more difficult to assimilate colours which are unlike to their own as well as to normal eyes, than others find it. And it is a curious question whether an enlargement of the series of colour-sensations would tend to throw our present colours closer together.

Prob. II. : *Are these two complexes alike in any respect?* This is a very familiar type of inquiry. We are asked whether we find two persons' voices, faces, or so forth, like one another. In all such cases a strong interest in likenesses generally needs to be supplemented by a special interest in the particular aspects in which likeness here happens to show itself. We much more readily detect a similarity between two faces when we feel a lively interest in all the structural details and dramatic play of feature which make up their possible grounds of similarity.

Here, again, we note a singular illustration of the deadening effect of familiarity on our power of assimilation. We can all at once discern the common type in the individuals of a family whose acquaintance we are just making. But how hard it is for us to detect the common elements of form and expression in members of our own family! In this case, too, we note that the effect of daily contact is to bring individual differences more and more into the foreground. Each brother's or sister's face is for us differentiated, individualised by innumerable associations. These tend more and more by their superior interest to overpower the common typical feature till it becomes exceedingly difficult, if not quite impossible, for us to see it at all.

The same fact is observable with respect to other complexes. The points of similarity between Bach and Handel, Beethoven and Schubert, are much more likely to arrest the attention of the young musical student comparatively strange to their works than the more advanced musician. Deeper knowledge serves to differentiate the composers' styles by a wider and wider interval. The points of similarity now seem superficial and insignificant, if recognised at all.¹

Finally, it may be just added that in this case, as in that of relatively simple contents, the readiness in detecting similarity is affected by the individual's range of impression or experience, constituting that standard of reference to

¹ Of course a profounder study will often disclose more subtle affinities : but on the whole fuller detailed knowledge seems to tend towards discrimination and separation.

which in every case there is a more or less distinct appeal. Thus, to give an obvious illustration, the points of similarity making up the typical English face are much more readily appreciated by one who has recently been travelling and observing widely dissimilar types.

Prob. III. : *In what respects do these two complexes resemble one another?* Here as before, in the case of discrimination, it is facility in the analysis and separate consideration of the elements which is the chief condition of success. To learn to fix the attention on particular features and aspects of things is, as we all know, a matter of time. Children learn to class things together because of certain resemblances long before they make the precise grounds of their classification perfectly distinct to themselves.

Next to this general aptitude in analysis comes a special familiarity with the basis or bases of similarity in any particular case. A practised literary critic could more easily than another determine or define the precise points of similarity (as he would those of difference) between two writers' styles, just because he had gained a special degree of familiarity with the several constituents of style.

By the two groups of problems just described we might measure an individual's power of discrimination and of assimilation for any particular class of impressions as well as his average capability in each of these great intellectual acts; but it has already been implied that the two acts, though fundamentally distinct, are not independent of one another. A person's readiness in detecting and localising a point of difference will be prejudicially affected by a lively feeling for the affinities of things; and it is a matter of common psychological observation that quick assimilation presupposes a measure of indifference to the diversities of objects. While, therefore, it is important to test each of these intellectual powers distinctly and apart, it is necessary as a supplementary process to estimate them in their relation to one another. In the case of any given individual, we may ask which of the tendencies is the stronger, the discovery of likeness or of unlikeness. And this line of investigation naturally assumes the form of an experimental inquiry into the nature and conditions of the mental process already described as that of

Indeterminate Comparison.

Here the presentations or objects to be compared exhibit both relations, difference and likeness. Thus, in the case of simple qualities, as colours, they must be supposed to

lie between the extremes, the minimum of difference perceptible and the maximum range of the assimilative energy. The special gist of the problem has to do with the relative force, impressiveness or perceptual momentum of these relations. And here it is evident that we are face to face with a problem of greater complexity than those hitherto considered. This is a problem of compound comparison, that is to say a comparison not of two simple contents, but of two relations between contents which have themselves been apprehended by previous processes of comparison. The mind is here concerned with deciding whether likeness or difference preponderates.

Now at first sight it might seem absurd to talk of measuring an amount of likeness against an amount of difference. Are these not heterogeneous and therefore incommensurable magnitudes, like the length of a line and the strength of a cup of tea? Yet it seems to me indisputable that we are often able to say that the difference between two contents exceeds the likeness, or *vice versâ*. This is true even of simple contents. All persons, I imagine, endowed with a normal, fully-developed colour-sense, would say that the resemblance between two adjacent hues, say peacock and ultramarine blue, was greater than the difference. What should we mean by this? It seems to me that in this case, too, there is a vague reference to a customary range of experience as a standard. We mean that the similarity between these two clearly allied hues is great and impressive relatively to the whole possible scale of degree of likeness among colours, and that contrariwise the difference is slight and almost evanescent relatively to the possible scale of differences. In other words, the resemblance here is far away from the minimum or faintest appreciable degree of chromatic affinity, whereas the difference is not far removed from the minimum perceptible. We may not be distinctly conscious of all this when we say that the similarity is greater, but a vague consciousness of it seems to be implied in the fact of the superior impressiveness and emotional effect of the similarity.

If this is the explanation of the preference in the case of simple presentations, the selection in the case of complex ones occasions no further difficulty. Here we have to do with a number of similarities and differences, and are called on to compare two sums of psychical effect, namely, the several impressions of likeness and difference of various degrees of force.

After this brief analysis of the nature of our compound

act in general, we may easily assign the more important conditions, *objective* and *subjective*, which determine the direction of preference in this unfettered mode of comparison.

(1) The most obvious objective condition serving to determine the mind of the subject to view any two given contents under one of the two great relations rather than under its opposite is its preponderance in the objects themselves. The superiority, in point of intensity as just defined and of extent, of likeness to unlikeness in two objects, as faces, is the most important objective circumstance which operates in the direction of assimilation rather than of discrimination; and the greater this preponderance, the more powerful and irresistible will this influence be.

A second objective circumstance, much less obvious than the preceding, which helps to determine the direction of this selective comparison is the degree of proximity of the objects compared in time and space. We often catch ourselves imagining two faces or two voices strikingly alike until they happen to present themselves simultaneously to our minds. Since things remind us of one another by their likeness but never by their difference, it is to be expected that, in comparing a present with an absent object (or two absent ones), we should in general tend to over-estimate likeness and under-estimate difference. Juxtaposition, though it may serve to disclose unobtrusive likenesses, tends on the whole greatly to favour the discrimination of objects.¹

As a third objective condition we may refer to the action of the surroundings of the objects compared. The proximity of a brilliant patch of carmine to two greens in juxtaposition would greatly favour our viewing these as alike. In other words they would virtually be approximated. The presence of a stranger of a strongly opposed type may help greatly in the assimilation of members of a family. On the other hand, two similar presentations may be virtually rendered more unlike by the proximity of a third object presenting a more striking amount of likeness to one of them. A slight superficial resemblance between two voices often disappears over against a deeper affinity.²

(2) Coming now to subjective conditions, we may at once

¹ The phenomena of simultaneous colour-contrast (if explicable as a modification of judgment and not as the result of physiological circumstances) would illustrate the same tendency in a very striking manner.

² It is evident that by the surroundings of an object is here meant not merely locally adjacent ones, but all objects or circumstances contiguous in time, whether presented contemporaneously or in immediate antecedence.

infer from what was said above that the viewing of two objects as like rather than the opposite, or *vice versa*, will depend on a number of individual or subjective circumstances which may be summed up as the relative disposition or habitual attitude of mind with reference to these opposites. Special familiarity with and interest in some detail of likeness, absence of expectation that this will present itself in the present instance, and finally the habitual preference for likeness over unlikeness as an object of apprehension, —these will all tend in the direction of assimilation rather than of discrimination. Similar individual conditions help to favour the preference for difference.

We have only space for a bare indication of the different problems falling under this head. They are logically divisible into two main divisions, according as we are dealing with simple or with complex contents. Each of these, again, may be subdivided into two branches according as we are seeking the subject's first impression or his final and deliberate decision. This subdivision, however, only becomes important in the case of the second division, that which has to do with complex contents. Hence, the problems (as already in our treatment of Assimilative Comparison) practically reduce themselves to three.

Prob. I. : *Are these simple qualities more like or unlike ?* The special conditions operating here are manifest. They are, first, the actual objective degree of proximity of the presentations in their appropriate scale ; secondly, the individual subject's special range of experience and habits of mind with reference to the particular order of impressions dealt with.¹

Prob. II. : *What is your first impression with respect to those two complex contents—are they rather like or unlike ?* Here the objective condition is relative number and strength of the points of similarity and difference ; the subjective, relative degree of susceptibility to the several constituent factors.

Prob. III. : *After carefully examining these two complex contents, which seems to you to preponderate—likeness or unlikeness ?* Here is presupposed a careful survey of the different aspects or ingredients of the two objects. The importance of the fuller process is that it tends to eliminate or at least greatly reduce the effect of accidental subjective influences, such as that of expectation which would give an undue impressiveness at the outset to certain features.

¹ This form of question may be expected to yield very different results at different parts of the scale. It would be curious to estimate the limits within which confident answers are given, and the margin of uncertainty.

The foregoing are, I conceive, the more important lines of inquiry which would need to be followed out in investigating the faculty of Comparison and its various manifestations in different individuals. If space permitted, other and interesting problems of comparison might have been discussed. More particularly it would have been desirable to dwell on that familiar and important form of comparison in which certain differences are compared with other differences, certain likenesses with other likenesses in point of degree. In the course of this paper we have found again and again how what at first seems a mere discovery of likeness or difference involves a sub-conscious comparison and measurement of degree. In truth, the problem of ascertaining a bare resemblance or difference continually tends to become a question of estimating its degree in relation to some customary standard.¹ This factor of measurement assumed greater distinctness in the case of what I have called Indeterminate Comparison. In certain cases, however, the mind may be called on to distinctly think of, and to measure one with another, two degrees of difference or of similarity. Thus, we may be asked whether the contrast between one pair of colours is greater than that between another, or whether the likeness between one face and another is greater than that between the first face and a third. Prof. Stumpf has clearly indicated the nature of this interesting line of investigation in what he calls Comparisons of Distance (*Distanz-Vergleichungen*).²

I am well aware that the several lines of research indicated in this paper have only been opened up in a provisional manner. They need to be followed out farther with something like scientific exactness. Here, I can but express my conviction that the fruitful modern method of estimating the complexity of mental processes by an exact measurement of their duration might with great advantage be extended to acts of Comparison. It would, for example, be a matter of great interest to measure (in a variety of cases) the interval between the first faint detection of a likeness (or an unlikeness) and the final definition of its *locus* or seat.

¹ See especially what was said respecting the limits of the apprehension of likeness between simple contents.

² *Tonpsychologie*, i. § 7. As Prof. Stumpf points out, the idea of distance may be taken as referring either to the decreasing similarity or the increasing difference. And so we may say that the comparison of distances is at once a measurement of likeness and of difference.