

pleasure obtainable when from a set of experiences $p_1, p_2, \dots p_r$, either p_1 or the contradictory of p_1 , and either p_2 or the contradictory of $p_2 \dots$, and either p_r or the contradictory of p_r , have to be chosen.

To discuss further the details of the axiom of summation which has been suggested would be to become involved in a mass of technicalities. As stated, it gives good promise of yielding elegant and interesting results in a calculus of pleasures. But very many interesting and difficult points remain to be discussed. I would like to add a few remarks about the nature of the *influences* which we have made use of in this paper. The influence of p, q, r on the pleasure of s , the influence of p, r, s on the pleasure of q , and so on, may be regarded as *coefficients* of the system p, q, r , and s . And the system p, q, r , and s will not be sufficiently defined to enable us to estimate the pleasure of p, q, r , and s together unless certain of these coefficients are known as well as the pleasure of p, q, r , and s separately. A particular set of experiences possesses these coefficients, just as a particular metal possesses a particular coefficient of expansion. The notion of such coefficients is, of course, very familiar in mathematics and physics, and it appears to be fruitful in such problems as the estimate of values in combination. It has been applied with very interesting results to the case of probabilities by Mr. W. E. Johnson, and it is his use of a coefficient of dependence between two events, which has reference to the probabilities of the events, that has suggested the introduction of the notion of the influence of experiences on the pleasure of another experience.

3.—ASSOCIATION.

By ARTHUR LYNCH.

WHEN association is recognised as one of the fundamental processes of the mind the question becomes lifted into a new plane; we gain a clearer view not only of the association of

ideas, but of the association of ideas, emotions, passions, each with the others; and finally we see that the interest of successive ideas, the depth and intensity of the impressions made, depend on the entire style and temperament of the subject, ultimately on the complex of the physical qualities which influence the constitution of the mind. I have elsewhere* summed up these considerations in the aphorism, "the whole man thinks"; and, in my *Psychology: A New System*, I have submitted the matter to a detailed examination.

The following is a more general enunciation of the position: Given a system—as, for instance, a human being—composed of certain elements, physical and mental (and these in the final result of our analysis are not regarded as independent of mutual reactions), given also the power of interpreting the reactions of forces, physical and mental, within the system, we can then determine the movements of that system in a given milieu. This is theoretical in a sense similar to that in which we say that the movement of a projectile would be capable of definition from the consideration of the movements of each of its atoms and the forces brought to play on them; the powers of calculation would certainly be in default, but in certain cases it is possible to obtain guidance as to how all these forces and movements sum up in resultants. So it is with the human system in regard to association; we cannot trace out the actions of the myriad forces involved though conceiving them as being determinate, but we can ascertain in broad outlines certain of their resultants.

In order to make the matter more graphic, consider a limited field of experience formed in main part by a succession of sensations of colour. Now consider another experience differing from the first only in the nature of the colours. There is a similarity of the movements of the mind in the two cases. The form of those movements I indicate as the schema of the

* In *Human Documents*.

experience. I now enlarge the field, and I say that we can have cases of complicated experiences differing from each other in regard to the quality of the elements of sense which go to form the experiences, but such that the schemata in these cases are similar. Further, seeing the fundamental processes are the elements from which all mental activity is composed, it must follow that differences of experience depend on differences of the combination of these processes—forming the different schemata—taken together with the different characters, referred ultimately, for instance, to diverse qualities of sensation, of the actual objects of these experiences. Hence in various forms of mental experience, apparently quite remote from each other, we may discover analogies.

To give an example, I have found an exercise in psychology in tracing out homologous forms that exist between the mental acts of a mathematician seeking the solution of a problem and those of a cabman finding his way about London. In this respect I remember a saying of Sir William Gowers, the famous neurologist, with whom I studied for a time; he told me that part of his system of diagnosis reminded him of a clerk's book-keeping. He mentioned this, not as the result of a consideration of the general psychological question, but as a suggestion which had occurred to him in the course of practice. The current metaphors which form the base of language arise in simpler phases of the same kind of experiences, and the study is seen to develop in a variety of directions.

But I further note this. Seeing that the character of experience is determined on the one hand by the total make-up of the subject, and on the other by the nature of the milieu in which the subject is placed, and considering that the careers of men are directed often by accidental causes, we should expect to find evidence of the style and temperament of a thinker, or of a man of action, in the manner in which he addresses himself to his work and presents his achievements. Here, again, we arrive at an interesting and fertile field of study. I have traced out, for

instance, the influence of the temperaments of great philosophers on the character of their ethical systems. Also, in a more curious way still, I find that in a study so recondite and impersonal as mathematics the temperament of a man of genius makes itself evident. One notices in Descartes the satisfaction with the clear apprehension of essential principles, as contrasted with the elaborate thoroughness of Plücker, or the meticulous circumspection of Hamilton. In Abel we have the sentiment of intention and tireless energy. To read Lagrange after reading Laplace is to talk to an artist after working with a carpenter.*

Again, in another field, contrast the methods of Davy and Faraday, both men of great achievement though so different in manner. Davy has the temperament of a cavalry officer, and this style is imprinted on his work. The scrupulous Faraday was captivated by Davy's flashes of genius, but shocked by the irregularity of his methods. In another region, take the works of Rabelais, Pascal, Sir Thomas More, and Calderon, and study these from the one point of view of their efforts for the moral uplifting of the people; one sees the analogies which the essential schemata present amid the extraordinary diversities of the matter. In still another field, works so diverse as *Paradise Lost*, *Don Juan*, *Sartor Resartus*, and *Endymion*, will be found to have a deeply based analogy. They are the spiritual biographies of Milton, Byron, Carlyle, and Keats; it would be possible not merely to exhibit this aspect of the matter but also to show how the temperament, the character of experience, the relative strength and limitations of thought in various directions, led each in turn to the form of his work.

Out of the multitude of problems that occur in developing

* Jean Bernoulli, on receiving an unsigned solution of a problem, said, "I know the Lion by its claws"—he meant Newton. Felix Klein, in discoursing on the work of Riemann, refers to the influence of individuality even in the realm of abstract thoughts.

this theme, there is one which has especial interest in the history of literature, viz., that of gaining some light on the character of Shakespeare from a study of his works. It is evident from what has been already said that no one could have written so much as Shakespeare, however "objective" his view of life may have been, without leaving unmistakably on his works deep traces of his own personality. These would be discoverable in the very choice of subjects, and in the mode of their treatment, allowing, of course, for the influence of the taste of the public and the requirements of the theatre.

The personal factor becomes revealed in repetitions of ideas, in reiterations of words, and particularly in the intrusion of suggestions that do not arise naturally out of the scene, or that introduce any kind of incongruity: and, in this regard, it must be noted that omissions may be also of importance. A concordance already gives a rough indication, even if no more discrimination be used than in assigning weight to ideas on the mechanical ground of the number of words expressing such ideas. Take, for instance, the words *woman* and *love* on the one hand, and *cross* and *redemption* on the other, and note with what relative frequency they are employed by Shakespeare and Calderon. To put the question is already to point out the drift of the answer, and to affirm the value of the method.

A complete study of any work of literature, with the view of reconstituting the character of the author, would require a systematic examination, or, rather, successive examinations, set up in turn to find the answer to questions such as those which follow: What evidences exist of the degree of education, or of special training? What is the character of the knowledge displayed? Does it show any notable acquaintance with the science of the time? Is it strong in history? How does the technical skill exhibited, for example, in versification or in stagecraft, compare with that of contemporaries? In all this, what conception arises of the development of the

mind? How is the bent of the mind shown in the oft-recurring words, in ideas brought into unusual association, in sportive moods, in unseasonable expressions? What is the attitude towards great striking facts of the time, either of politics or of religion? Where is admiration particularly displayed? What is the character of passages that break forth most naturally, spontaneously, with enthusiasm, with warmth of language, with wealth of associations, with an air of freedom and familiarity, with imagery inspired, or with surprise of happy touches?

In order to verify certain of these principles, I have looked at Shakespeare's sonnets in a new light, and I believe that I have found in them dominant trends of thought more or less loosely consecutive; and by close attention to certain peculiarities of language in Sonnet LXXVI—the sonnet beginning: "Why is my verse so barren of new pride?"—I have come upon a discovery of the secret concealed in the dedication of these poems. The exercise here involved is of unusual interest, and with the hint given I leave to the reader this study in association.
