SENSATION.

I have said that Psychology deals with a class of facts open to observation and that its main business is to discover, analyse, classify and explain them. By observation we find that what we call our mind, is a series of conscious states flowing like a stream, partly interrupted in sleep, constantly changing, and succeeding each other quickly at one time and slowly at another. These states possess various degrees of vividness: some are faint and are called *ideas*; others exceedingly vivid, appear external and are called *things*. These latter form the subject matter of physical sciences, but Psychology would show how all facts external or internal are ultimately certain mental states and how these in time divide themselves into two groups of facts—*world* and *mind*.

Observation shows that our present mental states are exceedingly complex. Take for instance sympathy. It involves some *knowledge* of misery in another, some *pain* felt in consequence thereof, and a *desire* to help. If we analyse these complex mental facts, we find they fall into three distinct classes:—

(1) Certain mental facts felt as external things or relations, or copies more or less faint of such things or relations *e. g.*, the house before me, or an image of it when the house is absent.

(2) Certain others which are felt as purely subjective or internal—*e. g.*, doubt, anger, pain, surprise, belief which accompany the facts of the first class.

(3) Certain others which are felt as subjective but active, *e. g.*, desire, resolution or choice.

The first class are called cognitive facts; the second, feelings; the third, conative facts. In this paper I shall confine myself to the simplest cognitive fact known as *Sensation*. In

future I shall try to show how our complex cognitive facts develop out of this elementary conscious change.

A sensation generally occurs when the sensory centres of the brain are excited by some external current. The external stimulus usually acts on some sense-organ, generates a molecular motion which travels up the sensory nerve to the brain. In exceptional cases the centres may be excited by some mechanical pressure on the head, or some change in the quantity or quality of blood, or any other agent, as for instance, electricity. And whenever and by whatever means a sensory centre is excited by some external current, a conscious change occurs known as sensation.

Let us take the example of certain etherial vibrations which strike the retina. A nervous impulse is thereon generated—some form of molecular motion—which goes up the optic nerve and reaches the centre. This *motion* in the centre causes a sensation (*jnan*). How a motion of the centre can produce a feeling is an ultimate question to which no answer can be given in an empirical science. But the fact remains that when the brain-centres are excited, certain conscious changes occur, and that mental changes are absolutely dependent upon certain antecedent changes in the brain.

Now observe closely this most elementary mental thing, sensation. At present it is felt as an external attribute of an external thing, but originally it was a mere felt-change carrying no sense of its externality. Light to a child just born is not an external thing but a mere conscious change. We shall see later on how sensations, admittedly mental, come to appear as foreign objects. Originally it thus exists in time alone though subsequently it acquires a spatial attribute. It differs from sound, smell, taste, heat and cold in *quality*. It is interesting to note these qualitative distinctions among sen-

sations—the various kinds of smell, of taste, of touch, of sound and so forth, most of which remain undistinguished and unnamed, though sounds and colours have been partly discriminated by the fine arts.

A sensation has also a certain intensity which varies within certain limits with the intensity of the stimulus. I need not explain here Weber's Law showing the relation between sensation and stimulus. Any and every stimulus would not produce a sensation. A feather dropped from the hand to the floor may not produce a sound. As the stimulus increases in intensity, the sensation also increases in intensity but more slowly and a point is soon reached when an additional stimulus would not produce an additional sensation. When a certain stimulus is causing a sensation, to produce a just perceptible additional sensation the stimulus to be added most bear a definite proportion to the given stimulus. For instance in case of light, an addition of $\frac{1}{100}$th of the stimulus already engaged has been found to be necessary to produce a just perceptible addition to the sensation; in case of sound, an addition of $\frac{1}{3}$; in case of muscular sensation $\frac{1}{17}$, showing that the discriminative susceptibility of the eye is much greater than that of the ear.

Besides quality and quantity every sensation has some *extensity*, that is, it is felt to be bigger or smaller than another. The notes of a higher pitch are felt to be narrower than these of a lower pitch. The coloured surface originally received by the eye varies in dimensions according to the number of retinal points excited. It occupies some time and always lasts a little longer than the stimulus owing to the centres continuing to vibrate for sometime after the stimulus is removed. A disk with alternate black and white sectors if rotated rapidly before the eye would look gray as the stimulation due to each lasts until the next begins.

A sensation is immediately followed by certain reflex actions affecting the circulation, the internal organs, the general temperature of the body etc., evidently owing to the sensory current escaping into the motor centres. It often prompts a self preservative movement and seems to be our guide in all habitual movements as in walking along a familiar road, which occur without the intervention of an idea. Its nature is modified and coloured by the simultaneous and immediately preceding sensations as is proved by the phenomena of simultaneous colour contrasts, by the tastelessness of an orange after taking sugar, by the green we see when we look at a white wall after steadily looking at and thereby tiring our retina for red.

Each sensation, we also notice, is also coloured by some pleasure or pain. It is generally found to be neutral at a certain intensity, grows pleasant as the intensity increases, continues pleasant up to a certain point, above which it becomes painful. If repeated, this pleasurable or painful element may drop off or what was pleasurable becomes painful and vice versa. A cup of excellent tea loses its affective tone through habit; smoking originally painful grows pleasant; bright red pleasant at first glance gets painful if steadily looked at, if continued for a long time it grows neutral and ultimately disappears. Bright green becomes dark, a noisy mill ceases to be troublesome, ticks of a clock before me become inaudible. Probably the sensation even in such a case remains sub-conscious. For when my clock stops, I feel something wrong till I find it out.

Another important characteristic of sensation is that it excites belief and emotion. A live tiger giving a sensation excites more fear and belief than an imaginary one. Images mistaken for sensations or rendered vivid by a sensation powerfully excite belief. Hence the value of relics, the interest of good novels, the apparent reality of dreams and other illusions, the

effect of ghost stories in a dark room, and the constant demand for verification in science.

These are some of the properties of sensations. There are others which a careful student with powers of observation may easily find out.

P. L. B.

EXTRACT.

ARTS *vs* SCIENCE.

(Sir R. C. Jebb).

The claims of literary culture, as part of the general higher education, must not be neglected or undervalued. It may be that, in the pre-scientific age, those claims were occasionally stated in a somewhat exaggerated or one-sided manner. But it remains as true as ever that literary studies form an indispensable element of a really liberal education. And the educational value of good literature is all the greater in our day because the progress of knowledge more and more enforces early specialisation. Good literature tends to preserve the breadth and variety of intellectual interests. It also tends to cultivate the sympathies; it exerts a humanising influence by the clear and beautiful expression of noble thoughts and sentiments; by the contemplation of great actions and great characters; by following the varied development of human life, not only as an evolution governed by certain laws, but also as a drama full of interest which intimately concerns us. Moreover, as has well been said, if literature be viewed as one of the fine arts, it is found to be the most altruistic of them all, since it can educate a sensibility for other forms of beauty besides its own. The genius of a Ruskin can quicken our feeling for masterpieces of architecture, sculpture and painting. Even a very limited study of literature, if it be only of the right quality, may provide permanent springs of