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## PSYCHOLOGY.

## CHAPTER I.

## THE SCOPE OF PSYCHOLOGY.

PSYCHOLOGY is the Science of Mental Life, both of its phenomena and their conditions. The phenomena are such things as we call feelings, desires, cognitions, reasonings, decisions, and the like; and, superficially considered, their variety and complexity is such as to leave a chaotic impression on the observer. The most natural and consequently the earliest way of unifying the material was, first, to classify it as well as might be, and, secondly, to affiliate the diverse mental modes thus found, upon a simple entity, the personal Soul, of which they are taken to be so many facultative manifestations. Now, for instance, the Soul manifests its faculty of Memory, now of Reasoning, now of Volition, or again its Imagination or its Appetite. This is the orthodox 'spiritualistic' theory of scholasticism and of common-sense. Another and a less obvious way of unifying the chaos is to seek common elements *in* the divers mental facts rather than a common agent behind them, and to explain them constructively by the various forms of arrangement of these elements, as one explains houses by stones and bricks. The 'associationist' schools of Herbart in Germany, and of Hume the Mills and Bain in Britain have thus constructed a *psychology without a soul* by taking discrete 'ideas,' faint or vivid, and showing how, by their cohesions, repulsions, and forms

of succession, such things as reminiscences, perceptions, emotions, volitions, passions, theories, and all the other furnishings of an individual's mind may be engendered. The very Self or *ego* of the individual comes in this way to be viewed no longer as the pre-existing source of the representations, but rather as their last and most complicated fruit.

Now, if we strive rigorously to simplify the phenomena in either of these ways, we soon become aware of inadequacies in our method. Any particular cognition, for example, or recollection, is accounted for on the soul-theory by being referred to the spiritual faculties of Cognition or of Memory. These faculties themselves are thought of as absolute properties of the soul; that is, to take the case of memory, no reason is given why we should remember a fact as it happened, except that so to remember it constitutes the essence of our Recollective Power. We may, as spiritualists, try to explain our memory's failures and blunders by secondary causes. But its *successes* can invoke no factors save the existence of certain objective things to be remembered on the one hand, and of our faculty of memory on the other. When, for instance, I recall my graduation-day, and drag all its incidents and emotions up from death's dateless night, no mechanical cause can explain this process, nor can any analysis reduce it to lower terms or make its nature seem other than an ultimate *datum*, which, whether we rebel or not at its mysteriousness, must simply be taken for granted if we are to psychologize at all. However the associationist may represent the present ideas as thronging and arranging themselves, still, the spiritualist insists, he has in the end to admit that *something*, be it brain, be it 'ideas,' be it 'association,' *knows* past time *as* past, and fills it out with this or that event. And when the spiritualist calls memory an 'irreducible faculty,' he says no more than this admission of the associationist already grants.

And yet the admission is far from being a satisfactory simplification of the concrete facts. For why should this absolute god-given Faculty retain so much better the events of yesterday than those of last year, and, best of all, those

of an hour ago? Why, again, in old age should its grasp of childhood's events seem firmest? Why should illness and exhaustion enfeeble it? Why should repeating an experience strengthen our recollection of it? Why should drugs, fevers, asphyxia, and excitement resuscitate things long since forgotten? If we content ourselves with merely affirming that the faculty of memory is so peculiarly constituted by nature as to exhibit just these oddities, we seem little the better for having invoked it, for our explanation becomes as complicated as that of the crude facts with which we started. Moreover there is something grotesque and irrational in the supposition that the soul is equipped with elementary powers of such an ingeniously intricate sort. Why *should* our memory cling more easily to the near than the remote? Why should it lose its grasp of proper sooner than of abstract names? Such peculiarities seem quite fantastic; and might, for aught we can see *a priori*, be the precise opposites of what they are. Evidently, then, *the faculty does not exist absolutely, but works under conditions*; and *the quest of the conditions* becomes the psychologist's most interesting task.

However firmly he may hold to the soul and her remembering faculty, he must acknowledge that she never exerts the latter without a *cue*, and that something must always precede and *remind* us of whatever we are to recollect. "An *idea!*" says the associationist, "an idea associated with the remembered thing; and this explains also why things repeatedly met with are more easily recollected, for their associates on the various occasions furnish so many distinct avenues of recall." But this does not explain the effects of fever, exhaustion, hypnotism, old age, and the like. And in general, the pure associationist's account of our mental life is almost as bewildering as that of the pure spiritualist. This multitude of ideas, existing absolutely, yet clinging together, and weaving an endless carpet of themselves, like dominoes in ceaseless change, or the bits of glass in a kaleidoscope,—whence do they get their fantastic laws of clinging, and why do they cling in just the shapes they do?

For this the associationist must introduce the order of experience in the outer world. The dance of the ideas is

a copy, somewhat mutilated and altered, of the order of phenomena. But the slightest reflection shows that phenomena have absolutely no power to influence our ideas until they have first impressed our senses and our brain. The bare existence of a past fact is no ground for our remembering it. Unless we have seen it, or somehow *undergone* it, we shall never know of its having been. The experiences of the body are thus one of the conditions of the faculty of memory being what it is. And a very small amount of reflection on facts shows that one part of the body, namely, the brain, is the part whose experiences are directly concerned. If the nervous communication be cut off between the brain and other parts, the experiences of those other parts are non-existent for the mind. The eye is blind, the ear deaf, the hand insensible and motionless. And conversely, if the brain be injured, consciousness is abolished or altered, even although every other organ in the body be ready to play its normal part. A blow on the head, a sudden subtraction of blood, the pressure of an apoplectic hemorrhage, may have the first effect; whilst a very few ounces of alcohol or grains of opium or hasheesh, or a whiff of chloroform or nitrous oxide gas, are sure to have the second. The delirium of fever, the altered self of insanity, are all due to foreign matters circulating through the brain, or to pathological changes in that organ's substance. The fact that the brain is the one immediate bodily condition of the mental operations is indeed so universally admitted nowadays that I need spend no more time in illustrating it, but will simply postulate it and pass on. The whole remainder of the book will be more or less of a proof that the postulate was correct.

Bodily experiences, therefore, and more particularly brain-experiences, must take a place amongst those conditions of the mental life of which Psychology need take account. *The spiritualist and the associationist must both be 'cerebralists,'* to the extent at least of admitting that certain peculiarities in the way of working of their own favorite principles are explicable only by the fact that the brain laws are a codeterminant of the result.

Our first conclusion, then, is that a certain amount of brain-physiology must be presupposed or included in Psychology.\*

In still another way the psychologist is forced to be something of a nerve-physiologist. Mental phenomena are not only conditioned *a parte ante* by bodily processes; but they lead to them *a parte post*. That they lead to *acts* is of course the most familiar of truths, but I do not merely mean acts in the sense of voluntary and deliberate muscular performances. Mental states occasion also changes in the calibre of blood-vessels, or alteration in the heart-beats, or processes more subtle still, in glands and viscera. If these are taken into account, as well as acts which follow at some *remote period* because the mental state was once there, it will be safe to lay down the general law that *no mental modification ever occurs which is not accompanied or followed by a bodily change*. The ideas and feelings, *e.g.*, which these present printed characters excite in the reader's mind not only occasion movements of his eyes and nascent movements of articulation in him, but will some day make him speak, or take sides in a discussion, or give advice, or choose a book to read, differently from what would have been the case had they never impressed his retina. Our psychology must therefore take account not only of the conditions antecedent to mental states, but of their resultant consequences as well.

But actions originally prompted by conscious intelligence may grow so automatic by dint of habit as to be apparently unconsciously performed. Standing, walking, buttoning and unbuttoning, piano-playing, talking, even saying one's prayers, may be done when the mind is absorbed in other things. The performances of animal *instinct* seem semi-automatic, and the *reflex acts* of self-preservation certainly are so. Yet they resemble intelligent acts in bringing about the *same ends* at which the animals' consciousness, on other occasions, deliberately aims.

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\* Cf. Geo. T. Ladd: Elements of Physiological Psychology (1887), pt. III, chap. III, §§ 9, 12.

Shall the study of such machine-like yet purposive acts as these be included in Psychology?

The boundary-line of the mental is certainly vague. It is better not to be pedantic, but to let the science be as vague as its subject, and include such phenomena as these if by so doing we can throw any light on the main business in hand. It will ere long be seen, I trust, that we can; and that we gain much more by a broad than by a narrow conception of our subject. At a certain stage in the development of every science a degree of vagueness is what best consists with fertility. On the whole, few recent formulas have done more real service of a rough sort in psychology than the Spencerian one that the essence of mental life and of bodily life are one, namely, 'the adjustment of inner to outer relations.' Such a formula is vagueness incarnate; but because it takes into account the fact that minds inhabit environments which act on them and on which they in turn react; because, in short, it takes mind in the midst of all its concrete relations, it is immensely more fertile than the old-fashioned 'rational psychology,' which treated the soul as a detached existent, sufficient unto itself, and assumed to consider only its nature and properties. I shall therefore feel free to make any sallies into zoology or into pure nerve-physiology which may seem instructive for our purposes, but otherwise shall leave those sciences to the physiologists.

Can we state more distinctly still the manner in which the mental life seems to intervene between impressions made from without upon the body, and reactions of the body upon the outer world again? Let us look at a few facts.

If some iron filings be sprinkled on a table and a magnet brought near them, they will fly through the air for a certain distance and stick to its surface. A savage seeing the phenomenon explains it as the result of an attraction or love between the magnet and the filings. But let a card cover the poles of the magnet, and the filings will press forever against its surface without its ever occurring to them to pass around its sides and thus come into

more direct contact with the object of their love. Blow bubbles through a tube into the bottom of a pail of water, they will rise to the surface and mingle with the air. Their action may again be poetically interpreted as due to a longing to recombine with the mother-atmosphere above the surface. But if you invert a jar full of water over the pail, they will rise and remain lodged beneath its bottom, shut in from the outer air, although a slight deflection from their course at the outset, or a re-descent towards the rim of the jar when they found their upward course impeded, would easily have set them free.

If now we pass from such actions as these to those of living things, we notice a striking difference. Romeo wants Juliet as the filings want the magnet; and if no obstacles intervene he moves towards her by as straight a line as they. But Romeo and Juliet, if a wall be built between them, do not remain idiotically pressing their faces against its opposite sides like the magnet and the filings with the card. Romeo soon finds a circuitous way, by scaling the wall or otherwise, of touching Juliet's lips directly. With the filings the path is fixed; whether it reaches the end depends on accidents. With the lover it is the end which is fixed, the path may be modified indefinitely.

Suppose a living frog in the position in which we placed our bubbles of air, namely, at the bottom of a jar of water. The want of breath will soon make him also long to rejoin the mother-atmosphere, and he will take the shortest path to his end by swimming straight upwards. But if a jar full of water be inverted over him, he will not, like the bubbles, perpetually press his nose against its unyielding roof, but will restlessly explore the neighborhood until by re-descending again he has discovered a path round its brim to the goal of his desires. Again the fixed end, the varying means!

Such contrasts between living and inanimate performances end by leading men to deny that in the physical world final purposes exist at all. Loves and desires are to-day no longer imputed to particles of iron or of air. No one supposes now that the end of any activity which they may display is an ideal purpose presiding over the

activity from its outset and soliciting or drawing it into being by a sort of *vis a fronte*. The end, on the contrary, is deemed a mere passive result, pushed into being a *tergo*, having had, so to speak, no voice in its own production. Alter the pre-existing conditions, and with inorganic materials you bring forth each time a different apparent end. But with intelligent agents, altering the conditions changes the activity displayed, but not the end reached; for here the idea of the yet unrealized end co-operates with the conditions to determine what the activities shall be.

*The pursuance of future ends and the choice of means for their attainment are thus the mark and criterion of the presence of mentality* in a phenomenon. We all use this test to discriminate between an intelligent and a mechanical performance. We impute no mentality to sticks and stones, because they never seem to move for *the sake of* anything, but always when pushed, and then indifferently and with no sign of choice. So we unhesitatingly call them senseless.

Just so we form our decision upon the deepest of all philosophic problems: Is the Kosmos an expression of intelligence rational in its inward nature, or a brute external fact pure and simple? If we find ourselves, in contemplating it, unable to banish the impression that it is a realm of final purposes, that it exists for the sake of something, we place intelligence at the heart of it and have a religion. If, on the contrary, in surveying its irremediable flux, we can think of the present only as so much mere mechanical sprouting from the past, occurring with no reference to the future, we are atheists and materialists.

In the lengthy discussions which psychologists have carried on about the amount of intelligence displayed by lower mammals, or the amount of consciousness involved in the functions of the nerve-centres of reptiles, the same test has always been applied: Is the character of the actions such that we must believe them to be performed *for the sake* of their result? The result in question, as we shall hereafter abundantly see, is as a rule a useful one,—the animal is, on the whole, safer under the circumstances for bringing it forth. So far the action has a teleological character;

but such mere outward teleology as this might still be the blind result of *vis a tergo*. The growth and movements of plants, the processes of development, digestion, secretion, etc., in animals, supply innumerable instances of performances useful to the individual which may nevertheless be, and by most of us are supposed to be, produced by automatic mechanism. The physiologist does not confidently assert conscious intelligence in the frog's spinal cord until he has shown that the useful result which the nervous machinery brings forth under a given irritation *remains the same when the machinery is altered*. If, to take the stock instance, the right knee of a headless frog be irritated with acid, the right foot will wipe it off. When, however, this foot is amputated, the animal will often raise the *left* foot to the spot and wipe the offending material away.

Pflüger and Lewes reason from such facts in the following way: If the first reaction were the result of mere machinery, they say; if that irritated portion of the skin discharged the right leg as a trigger discharges its own barrel of a shotgun; then amputating the right foot would indeed frustrate the wiping, but would not make the *left* leg move. It would simply result in the right stump moving through the empty air (which is in fact the phenomenon sometimes observed). The right trigger makes no effort to discharge the left barrel if the right one be unloaded; nor does an electrical machine ever get restless because it can only emit sparks, and not hem pillow-cases like a sewing-machine.

If, on the contrary, the right leg originally moved for the *purpose* of wiping the acid, then nothing is more natural than that, when the easiest means of effecting that purpose prove fruitless, other means should be tried. Every failure must keep the animal in a state of disappointment which will lead to all sorts of new trials and devices; and tranquillity will not ensue till one of these, by a happy stroke, achieves the wished-for end.

In a similar way Goltz ascribes intelligence to the frog's optic lobes and cerebellum. We alluded above to the manner in which a sound frog imprisoned in water will discover an outlet to the atmosphere. Goltz found that frogs deprived of their cerebral hemispheres would often exhibit

a like ingenuity. Such a frog, after rising from the bottom and finding his farther upward progress checked by the glass bell which has been inverted over him, will not persist in butting his nose against the obstacle until dead of suffocation, but will often re-descend and emerge from under its rim as if, not a definite mechanical propulsion upwards, but rather a conscious desire to reach the air by hook or crook were the main-spring of his activity. Goltz concluded from this that the hemispheres are the seat of intellectual power in frogs. He made the same inference from observing that a brainless frog will turn over from his back to his belly when one of his legs is sewed up, although the movements required are then very different from those excited under normal circumstances by the same annoying position. They seem determined, consequently, not merely by the antecedent irritant, but by the final end,—though the irritant of course is what makes the end desired.

Another brilliant German author, Liebmann,\* argues against the brain's mechanism accounting for mental action, by very similar considerations. A machine as such, he says, will bring forth right results when it is in good order, and wrong results if out of repair. But both kinds of result flow with equally fatal necessity from their conditions. We cannot suppose the clock-work whose structure fatally determines it to a certain rate of speed, noticing that this speed is too slow or too fast and vainly trying to correct it. Its conscience, if it have any, should be as good as that of the best chronometer, for both alike obey equally well the same eternal mechanical laws—laws from behind. But if the *brain* be out of order and the man says "Twice four are two," instead of "Twice four are eight," or else "I must go to the coal to buy the wharf," instead of "I must go to the wharf to buy the coal," instantly there arises a consciousness of error. The wrong performance, though it obey the same mechanical law as the right, is nevertheless condemned,—condemned as contradicting the inner law—the law from in front, the purpose or ideal for which the brain *should* act, whether it do so or not.

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\* Zur Analysis der Wirklichkeit, p. 489.

We need not discuss here whether these writers in drawing their conclusion have done justice to all the premises involved in the cases they treat of. We quote their arguments only to show how they appeal to the principle that *no actions but such as are done for an end, and show a choice of means, can be called indubitable expressions of Mind.*

I shall then adopt this as the criterion by which to circumscribe the subject-matter of this work so far as action enters into it. Many nervous performances will therefore be unmentioned, as being purely physiological. Nor will the anatomy of the nervous system and organs of sense be described anew. The reader will find in H. N. Martin's 'Human Body,' in G. T. Ladd's 'Physiological Psychology,' and in all the other standard Anatomies and Physiologies, a mass of information which we must regard as preliminary and take for granted in the present work.\* Of the functions of the cerebral hemispheres, however, since they directly subserve consciousness, it will be well to give some little account.

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\* Nothing is easier than to familiarize one's self with the mammalian brain. Get a sheep's head, a small saw, chisel, scalpel and forceps (all three can best be had from a surgical-instrument maker), and unravel its parts either by the aid of a human dissecting book, such as Holden's 'Manual of Anatomy,' or by the specific directions *ad hoc* given in such books as Foster and Langley's 'Practical Physiology' (Macmillan) or Morrell's 'Comparative Anatomy and Dissection of Mammalia' (Longmans).