The Principles of Psychology

William James (1890)

CHAPTER V
The Automaton-Theory, pp. 128-44

http://psychclassics.yorku.ca/James/Principles/prin5.htm

THE AUTOMATON-THEORY

[128] In describing the functions of the hemispheres a short way back, we used language derived from both the bodily and the mental life, saying now that the animal made indeterminate and unforeseeable reactions, and anon that he was swayed by considerations of future good and evil; treating his hemispheres sometimes as the seat of memory and ideas in the psychic sense, and sometimes talking of them as simply a complicated addition to his reflex machinery. This sort of vacillation in the point of view is a fatal incident of all ordinary talk about these questions; but I must now settle my scores with those readers to whom I already dropped a word in passing (see page 24, note) and who have probably been dissatisfied with my conduct ever since.

Suppose we restrict our view to facts of one and the same plane, and let that be the bodily plane: cannot all the outward phenomena of intelligence still be exhaustively described? Those mental images, those 'considerations,' whereof we spoke, - presumably they do not arise without neural processes arising simultaneously with them, and presumably each consideration corresponds to a process *sui generis*, and unlike all the rest. In other words, however numerous and delicately differentiated the train of ideas may be, the train of brain-events that runs alongside of it must in both respects be exactly its match, and we must postulate a neural machinery that offers a living counterpart for every shading, however fine, of the history of its owner's mind. Whatever degree of complication the latter may reach, the complication of the machinery must be quite as extreme, otherwise we should have to admit that there may be mental events to which no brain-events correspond. **[129]** But such an admission as this the physiologist is reluctant to make. It would violate all his beliefs. 'No psychosis without neurosis,' is one form which the principle of continuity takes in his mind.

But this principle forces the physiologist to make still another step. If neural action is as complicated as mind; and if in the sympathetic system and lower spinal cord we see what, so far as we know, is unconscious neural action executing deeds that to all outward intent may be called intelligent; what is there to hinder us from supposing that even where we know consciousness to be there, the still more complicated neural action which we believe to be its inseparable companion is alone and of itself the real agent of whatever intelligent deeds may appear? "As actions of a certain degree of complexity are brought about by mere mechanism, why may not actions of a still greater degree of complexity be the result of a more refined mechanism?" The conception of reflex action is surely one of the best conquests of physiological theory; why not be radical with it? Why not say that just as the spinal cord is a machine with few reflexes, so the hemispheres are a machine with many, and that that is all the difference? The principle of continuity would press us to accept this view.

But what on this view could be the function of the consciousness itself? *Mechanical* function it would have none. The sense-organs would awaken the

brain-cells; these would awaken each other in rational and orderly sequence, until the time for action came; and then the last brain-vibration would discharge downward into the motor tracts. But this would be a quite autonomous chain of occurrences, and whatever mind went with it would be there only as an 'epiphenomenon,' an inert spectator, a sort of 'foam, aura, or melody' as Mr. Hodgson says, whose opposition or whose furtherance would be alike powerless over the occurrences themselves. When talking, some time ago, we ought not, accordingly, *as physiologists*, to have said anything about 'considerations' as guiding the animal. We ought to have said 'paths left in the hemispherical cortex by former currents,' and nothing more.

Now so simple and attractive is this conception from the **[130]** consistently physiological point of view, that it is quite wonderful to see how late it was stumbled on in philosophy, and how few people, even when it has been explained to them, fully and easily realize its import. Much of the polemic writing against it is by men who have as yet failed to take it into their imaginations. Since this has been the case, it seems worth while to devote a few more words to making it plausible, before criticising it ourselves.

To Descartes belongs the credit of having first been bold enough to conceive of a completely self-sufficing nervous mechanism which should be able to perform complicated and apparently intelligent acts. By a singularly arbitrary restriction, however, Descartes stopped short at man, and while contending that in beasts the nervous machinery was all, he held that the higher acts of man were the result of the agency of his rational soul. The opinion that beasts have no consciousness at all was of course too paradoxical to maintain itself long as anything more than a curious item in the history of philosophy. And with its abandonment the very notion that the nervous system *per se* might work the work of intelligence, which was an integral, though detachable part of the whole theory, seemed also to slip out of men's conception, until, in this century, the elaboration of the doctrine of reflex action made it possible and natural that it should again arise. But it was not till 1870, I believe, that Mr. Hodgson made the decisive step, by saying that feelings, no matter how intensely they may be present, can have no causal efficacy whatever, and comparing them to the colors laid on the surface of a mosaic, of which the events in the nervous system are represented by the stones.[1] Obviously the stones are held in place by each other and not by the several colors which they support.

About the same time Mr. Spalding, and a little later Messrs. Huxley and Clifford, gave great publicity to an identical doctrine, though in their case it was backed by less refined metaphysical considerations.[2]

[131] A few sentences from Huxley and Clifford may be subjoined to make the matter entirely clear. Professor Huxley says:

> "The consciousness of brutes would appear to be related to the mechanism of their body simply as a collateral product of its working, and to be as completely without any power of modifying that working as the steam-whistle which accompanies the work of a locomotive engine is without influence on its machinery. Their volition, if they have any, is an emotion *indicative* of physical changes, not a *cause* of such changes. . . The soul stands related to the body as the bell of a clock to the works, and consciousness answers to the sound which the bell gives out when it is struck . . . Thus far I have strictly confined myself to the automatism of brutes . . . It is quite true that, to the best of my judgment, the argumentation which applies to brutes holds equally good of men; and, therefore, that all states of consciousness in us, as in them, are immediately caused by molecular changes of the brain-substance. It seems to me that in men, as in brutes, there is no proof that any state of consciousness is the cause of change in the motion of the matter of the organism. If these positions are well based, it follows that our mental conditions are simply the symbols in

consciousness of the changes which take place automatically in the organism; and that, to take an extreme illustration, the feeling we call volition is not the cause of a voluntary act, but the symbol of that state of the brain which is the immediate cause of that act. We are conscious automata."

Professor Clifford writes:

"All the evidence that we have goes to show that the physical world gets along entirely by itself, according to practically universal rules. . . . The train of physical facts between the stimulus sent into the eye, or to any one of our senses, and the exertion which follows it, and the train of physical facts which goes on in the brain, even when there is no stimulus and no exertion, - these are perfectly complete physical trains, and every step is fully accounted for by mechanical conditions. . . . The two things are on utterly different platforms - the physical facts go along by themselves, and the mental facts go along by themselves. There is a parallelism between them, but there is no interference of one with the other. Again, if anybody says that the will influences matter, the statement is not untrue, but it is nonsense. Such an assertion belongs to the crude materialism of the savage. The only **[132]** thing which influences matter is the position of surrounding matter or the motion of surrounding matter. . . . The assertion that another man's volition, a feeling in his consciousness that I cannot perceive, is part of the train of physical facts which I may perceive, - this is neither true non untrue, but nonsense; it is a combination of words whose corresponding ideas will not go together. . . . Sometimes one series is known better, and sometimes the other; so that in telling a story we speak sometimes of mental and sometimes of material facts. A feeling of chill made a man run; strictly speaking, the nervous disturbance which coexisted with that feeling of chill made him run, if we want to talk about material facts; or the feeling of chill produced the form of sub-consciousness which coexists with the motion of legs, if we want to talk about mental facts. . . .When, therefore, we ask: 'What is the physical link between the ingoing message from chilled skin and the outgoing message which moves the leg?' and the answer is, 'A man's will,' we have as much right to be amused as if we had asked our friend with the picture what pigment was used in painting the cannon in the foreground, and received the answer, 'Wrought iron.' It will be found excellent practice in the mental operations required by this doctrine to imagine a train, the fore part of which is an engine and three carriages linked with iron couplings, and the hind part three other carriages linked with iron couplings; the bond between the two parts being made up out of the sentiments of amity subsisting between the stoker and the guard."

To comprehend completely the consequences of the dogma so confidently enunciated, one should unflinchingly apply it to the most complicated examples. The movements of our tongues and pens, the flashings of our eyes in conversation, are of course events of a material order, and as such their causal antecedents must be exclusively material. If we knew thoroughly the nervous system of Shakespeare, and as thoroughly all his environing conditions, we should be able to show why at a certain period of his life his hand came to trace on certain sheets of paper those crabbed little black marks which we for shortness' sake call the manuscript of Hamlet. We should understand the rationale of every erasure and alteration therein, and we should understand all this without in the slightest degree acknowledging the existence of the thoughts in Shakespeare's mind. The words and sentences would be taken, not as signs of anything beyond themselves, but as little outward facts, pure and simple. In like manner we might exhaustively write the biography of those two hundred **[133]** pounds, more or less, of warmish albuminoid matter called Martin Luther, without ever implying that it felt.

But, on the other hand, nothing in all this could prevent us from giving an equally complete account of either Luther's or Shakespeare's spiritual history, an account in which every gleam of thought and emotion should find its place. The mind-

history would run alongside of the body-history of each man, and each point in the one would correspond to, but not react upon, a point in the other. So the melody floats from the harp-string, but neither checks nor quickens its vibrations; so the shadow runs alongside the pedestrian, but in no way influences his steps.

Another inference, apparently more paradoxical still, needs to be made, though, as far as I am aware, Dr. Hodgson is the only writer who has explicitly drawn it. That inference is that feelings, not causing nerve-actions, cannot even cause each other. To ordinary common sense, felt pain is, as such, not only the cause of outward tears and cries, but also the cause of such inward events as sorrow, compunction, desire, or inventive thought. So the consciousness of good news is the direct producer of the feeling of joy, the awareness of premises that of the belief in conclusions. But according to the automaton-theory, each of the feelings mentioned is only the correlate of some nerve-movement whose *cause* lay wholly in a previous nerve-movement. The first nerve-movement called up the second; whatever feeling was attached to the second consequently found itself following upon the feeling that was attached to the first. If, for example, good news was the consciousness correlated with the first movement, then joy turned out to be the correlate in consciousness of the second. But all the while the items of the nerve series were the only ones in causal continuity; the items of the conscious series, however inwardly rational their sequence, were simply juxtaposed.

REASONS FOR THE THEORY

The 'conscious automaton-theory,' as this conception is generally called, is thus a radical and simple conception of the manner in which certain facts may possibly occur. But **[134]** between conception and belief, proof ought to lie. And when we ask, 'What proves that all this is more than a mere conception of the possible?' it is not easy to get a sufficient reply. If we start from the frog's spinal cord and reason by continuity, saying, as that acts so intelligently, *though unconscious*, so the higher centres, *though conscious*, may have the intelligence they show quite as mechanically based; we are immediately met by the exact counter-argument from continuity, an argument actually urged by such writers as Pflüger and Lewes, which starts from the acts of the hemispheres, and says: "As *these* owe *their* intelligence to the consciousness which we know to be there, so the intelligence of the spinal cord's acts must really be due to the invisible presence of a consciousness lower in degree." All arguments from continuity work in two ways, you can either level up or level down by their means; and it is clear that such arguments as these can eat each other up to all eternity.

There remains a sort of philosophic faith, bred like most faiths from an aesthetic demand. Mental and physical events are, on all hands, admitted to present the strongest contrast in the entire field of being. The chasm which yawns between them is less easily bridged over by the mind than any interval we know. Why, then, not call it an absolute chasm, and say not only that the two worlds are different, but that they are independent? This gives us the comfort of all simple and absolute formulas, and it makes each chain homogeneous to our consideration. When talking of nervous tremors and bodily actions, we may feel secure against intrusion from an irrelevant mental world. When, on the other hand, we speak of feelings, we may with equal consistency use terms always of one denomination, and never be annoyed by what Aristotle calls 'slipping into another kind.' The desire on the part of men educated in laboratories not to have their physical reasonings mixed up with such incommensurable factors as feelings is certainly very strong. I have heard a most intelligent biologist say: "It is high time for scientific men to

protest against the recognition of any such thing as consciousness in a scientific investigation." In a word, feeling constitutes **[135]** the 'unscientific' half of existence, and any one who enjoys calling himself a 'scientist' will be too happy to purchase an untrammelled homogeneity of terms in the studies of his predilection, at the slight cost of admitting a dualism which, in the same breath that it allows to mind an independent status of being, banishes it to a limbo of causal inertness, from whence no intrusion or interruption on its part need ever be feared.

Over and above this great postulate that matters must be kept simple, there is, it must be confessed, still another highly abstract reason for denying causal efficacity to our feelings. We can form no positive image of the *modus operandi*of a volition or other thought affecting the cerebral molecules.

"Let us try to imagine an idea, say of food, producing a movement, say of carrying food to the mouth. . . . What is the method of its action? Does it assist the decomposition of the molecules of the gray matter, or does it retard the process, or does it alter the direction in which the shocks are distributed? Let us imagine the molecules of the gray matter combined in such a way that they will fall into simpler combinations on the impact of an incident force. Now suppose the incident force, in the shape of a shock from some other centre, to impinge upon these molecules. By hypothesis it will decompose them, and they will fall into the simpler combination. How is the idea of food to prevent this decomposition? Manifestly it can do so only by increasing the force which binds the molecules together. Good! Try to imagine the idea of a beefsteak binding two molecules together. It is impossible. Equally impossible is it to imagine a similar idea loosening the attractive force between two molecules."[3]

This passage from an exceedingly clever writer expresses admirably the difficulty to which I allude. Combined with a strong sense of the 'chasm' between the two worlds, and with a lively faith in reflex machinery, the sense of this difficulty can hardly fail to make one turn consciousness out of the door as a superfluity so far as one's explanations go. One may bow her out politely, allow her to remain as a 'concomitant,' but one insists that matter shall hold all the power.

"Having thoroughly recognized the fathomless abyss that separates mind from matter, and having so blended the very notion into his very **[136]** nature that there is no chance of his ever forgetting it or failing to saturate with it all his meditations, the student of psychology has next to appreciate the association between these two orders of phenomena. . . . They are associated in a manner so intimate that some of the greatest thinkers consider them different aspects of the same process. . . . When the rearrangement of molecules takes place in the higher regions of the brain, a change of consciousness simultaneously occurs. . . . The change of consciousness never takes place without the change in the brain; the change in the brain never . . . without the change in consciousness. But *why* the two occur together, or what the link is which connects them, we do not know, and most authorities believe that we never shall and never can know. Having firmly and tenaciously grasped these two notions, of the absolute separateness of mind and matter, and of the invariable concomitance of a mental change with a bodily change, the student will enter on the study of psychology with half his difficulties surmounted."[4]

Half his difficulties ignored, I should prefer to say. For this 'concomitance' in the midst of 'absolute separateness' is an utterly irrational notion. It is to my mind quite inconceivable that consciousness should have *nothing to do* with a business which it so faithfully attends. And the question, 'What has it to do?' is one which psychology has no right to 'surmount,' for it is her plain duty to consider it. The fact is that the whole question of interaction and influence between things is a metaphysical question, and

cannot be discussed at all by those who are unwilling to go into matters thoroughly. It is truly enough hard to imagine the 'idea of a beefsteak binding two molecules together;' but since Hume's time it has been equally hard to imagine *anything* binding them together. The whole notion of 'binding' is a mystery, the first step towards the solution of which is to clear scholastic rubbish out of the way. Popular science talks of 'forces,' 'attractions' or 'affinities' as binding the molecules; but clear science, though she may use such words to abbreviate discourse, has no use for the conceptions, and is satisfied when she can express in simple 'laws' the bare space-relations of the molecules as functions of each other and of time. To the more curiously inquiring mind, however, this simplified expression of the bare facts is not enough; there must **[137]** be a 'reason' for them, and something must 'determine' the laws. And when one seriously sits down to consider what sort of a thing one *means* when one asks for a 'reason,' one is led so far afield, so far away from popular science and its scholasticism, as to see that even such a fact as the existence or non-existence in the universe of 'the idea of a beefsteak' may not be wholly indifferent to other facts in the same universe, and in particular may have something to do with determining the distance at which two molecules in that universe shall lie apart. If this is so, then common-sense, though the intimate nature of causality and of the connection of things in the universe lies beyond her pitifully bounded horizon, has the root and gist of the truth in her hands when she obstinately holds to it that feelings and ideas are causes. However inadequate our ideas of causal efficacy may be, we are less wide of the mark when we say that our ideas and feelings have it, than the Automatists are when they say they haven't it. As in the night all cats are gray, so in the darkness of metaphysical criticism all causes are obscure. But one has no right to pull the pall over the psychic half of the subject only, as the automatists do, and to say that *that* causation is unintelligible, whilst in the same breath one dogmatizes about *material* causation as if Hume, Kant, and Lotze had never been born. One cannot thus blow hot and cold. One must be impartially *naif* or impartially critical. If the latter, the reconstruction must be thorough-going or 'metaphysical,' and will probably preserve the common-sense view that ideas are forces, in some translated form. But Psychology is a mere natural science, accepting certain terms uncritically as her data, and stopping short of metaphysical reconstruction. Like physics, she must be *naïve*; and if she finds that in her very peculiar field of study ideas *seem* to be causes, she had better continue to talk of them as such. She gains absolutely nothing by a breach with common-sense in this matter, and she loses, to say the least, all naturalness of speech. If feelings are causes, of course their effects must be furtherances and checkings of internal cerebral motions, of which in themselves we are entirely without knowledge. It is probable **[138]** that for years to come we shall have to infer what happens in the brain either from our feelings or from motor effects which we observe. The organ will be for us a sort of vat in which feelings and motions somehow go on stewing together, and in which innumerable things happen of which we catch but the statistical result. Why, under these circumstances, we should be asked to forswear the language of our childhood I cannot well imagine, especially as it is perfectly compatible with the language of physiology. The feelings can produce nothing absolutely new, they can only reinforce and inhibit reflex currents, and the original organization by physiological forces of these in paths must always be the ground-work of the psychological scheme.

My conclusion is that to urge the automaton-theory upon us, as it is now urged, on purely *a priori* and *quasi*-metaphysical grounds, is an *unwarrantable impertinence in the present state of psychology*.

REASONS AGAINST THE THEORY

But there are much more positive reasons than this why we ought to continue to talk in psychology as if consciousness had causal efficacy. The *particulars of the distribution of consciousness,* so far as we know them, *point to its being efficacious*. Let us trace some of them.

It is very generally admitted, though the point would be hard to prove, that consciousness grows the more complex and intense the higher we rise in the animal kingdom. That of a man must exceed that of an oyster. From this point of view it seems an organ, superadded to the other organs which maintain the animal in the struggle for existence; and the presumption of course is that is helps him in some way in the struggle, just as they do. But it cannot help him without being in some way efficacious and influencing the course of his bodily history. If now it could be shown in what way consciousness *might* help him, and if, moreover, the defects of his other organs (where consciousness is most developed) are such as to make them need just the kind of help that consciousness would bring provided it *were* efficacious; why, then the plausible inference **[139]** would be that it came just *because* of its efficacy - in other words, its efficacy would be inductively proved.

Now the study of the phenomena of consciousness which we shall make throughout the rest of this book will show us that consciousness is at all times primarily *a selecting agency*.[5] Whether we take it in the lowest sphere of sense, or in the highest of intellection, we find it always doing one thing, choosing one out of several of the materials so presented to its notice, emphasizing and accentuating that and suppressing as far as possible all the rest. The item emphasized is always in close connection with some *interest* felt by consciousness to be paramount at the time.

But what are now the defects of the nervous system in those animals whose consciousness seems most highly developed? Chief among them must be *instability*. The cerebral hemispheres are the characteristically 'high' nerve-centres, and we saw how indeterminate and unforeseeable their performances were in comparison with those of the basal ganglia and the cord. But this very vagueness constitutes their advantage. They allow their possessor to adapt his conduct to the minutest alterations in the environing circumstances, any one of which may be for him a sign, suggesting distant motives more powerful than any present solicitations of sense. It seems as if certain mechanical conclusions should be drawn from this state of things. An organ swayed by slight impressions is an organ whose natural state is one of unstable equilibrium. We may imagine the various lines of discharge in the cerebrum to be almost on a par in point of permeability - what discharge a given small impression will produce may be called *accidental*, in the sense in which we say it is a matter of accident whether a rain-drop falling on a mountain ridge descend the eastern or the western slope. It is in this sense that we may call it a matter of accident whether a child be a boy or a girl. The ovum is so unstable a body that certain causes too minute for our apprehension may at a certain moment tip it one way or the other. The natural law of an organ constituted after this **[140]** fashion can be nothing but a law of caprice. I do not see how one could reasonably expect from it any certain pursuance of useful lines of reaction, such as the few and fatally determined performances of the lower centres constitute within their narrow sphere. The dilemma in regard to the nervous system seems, in short, to be of the following kind. We may construct one which will react infallibly and certainly, but it will then be capable of reacting to very few changes in the environment - it will fail to be adapted to all the rest. We may, on the other hand, construct a nervous system potentially adapted to respond to an infinite variety of minute features in the situation;

but its fallibility will then be as great as its elaboration. We can never be sure that its equilibrium will be upset in the appropriate direction. In short, a high brain may do many things, and may do each of them at a very slight hint. But its hair-trigger organization makes of it a happy-go-lucky, hit-or-miss affair. It is as likely to do the crazy as the sane thing at any given moment. A low brain does few things, and in doing them perfectly forfeits all other use. The performances of a high brain are like dice thrown forever on a table. Unless they be loaded, what chance is there that the highest number will turn up oftener than the lowest?

All this is said of the brain as a physical machine pure and simple. *Can consciousness increase its efficiency by loading its dice*? Such is the problem.

Loading its dice would mean bringing a more or less constant pressure to bear in favor of *those* of its performances which make for the most permanent interests of the brain's owner; it would mean a constant inhibition of the tendencies to stray aside.

Well, just such pressure and such inhibition are what consciousness *seems* to be exerting all the while. And the interests in whose favor it seems to exert them are *its* interests and its alone, interests which it *creates*, and which, but for it, would have no status in the realm of being whatever. We talk, it is true, when we are darwinizing, as if the mere *body* that owns the brain had interests; we speak about the utilities of its various organs and how they help or hinder the body's survival; and we treat the survival as **[141]** if it were an absolute end, existing as such in the physical world, a sort of actual *should-be*, presiding over the animal and judging his reactions, quite apart from the presence of any commenting intelligence outside. We forget that in the absence of some such superadded commenting intelligence (whether it be that of the animal itself, or only ours or Mr. Darwin's), the reactions cannot be properly talked of as 'useful' or 'hurtful' at all. Considered merely physically, all that can be said of them is that *if* they occur in a certain way survival will as a matter of fact prove to be their incidental consequence. The organs themselves, and all the rest of the physical world, will, however, all the time be quite indifferent to this consequence, and would quite as cheerfully, the circumstances changed, compass the animal's destruction. In a word, survival can enter into a purely physiological discussion only as an *hypothesis made by an onlooker* about the future. But the moment you bring a consciousness into the midst, survival ceases to be a mere hypothesis. No longer is it, "if survival is to occur, then so and so must brain and other organs work." It has now become an imperative decree: "Survival *shall* occur, and therefore organs *must* so work!" *Real* ends appear for the first time now upon the world's stage. The conception of consciousness as a purely cognitive form of being, which is the pet way of regarding it in many idealistic-modern as well as ancient schools, is thoroughly anti-psychological, as the remainder of this book will show. Every actually existing consciousness seems to itself at any rate to be a *fighter for ends*, of which many, but for its presence, would not be ends at all. Its powers of cognition are mainly subservient to these ends, discerning which facts further them and which do not.

Now let consciousness only be what it seems to itself, and it will help an instable brain to compass its proper ends. The movements of the brain *per se* yield the means of attaining these ends mechanically, but only out of a lot of other ends, if so they may be called, which are not the proper ones of the animal, but often quite opposed. The brain is an instrument of possibilities, but of no certainties. But the consciousness, with its own ends present to it, and **[142]** knowing also well which possibilities lead thereto and which away, will, if endowed with causal efficacy, reinforce the favorable possibilities and repress the unfavorable or indifferent ones. The nerve-currents, coursing through the cells and fibres, must in this case be supposed strengthened by the fact of their

awaking one consciousness and dampening by awakening another. *How* such reaction of the consciousness upon the currents may occur must remain at present unsolved: it is enough for my purpose to have shown that it may not uselessly exist, and that the matter is less simple than the brain-automatists hold.

All the facts of the natural history of consciousness lend color to this view. Consciousness, for example, is only intense when nerve-processes are hesitant. In rapid, automatic, habitual action it sinks to a minimum. Nothing could be more fitting than this, if consciousness have the teleological function we suppose; nothing more meaningless, if not. Habitual actions are certain, and being in no danger of going astray from their end, need no extraneous help. In hesitant action, there seem many alternative possibilities of final nervous discharge. The feeling awakened by the nascent excitement of each alternative nerve-tract seems by its attractive or repulsive quality to determine whether the excitement shall abort or shall become complete. Where indecision is great, as before a dangerous leap, consciousness is agonizingly intense. Feeling, from this point of view, may be likened to a cross-section of the chain of nervous discharge, ascertaining the links already laid down, and groping among the fresh ends presented to it for the one which seems best to fit the case.

The phenomena of 'vicarious function' which we studied in Chapter II seems to form another bit of circumstantial evidence. A machine in working order acts fatally in one way. Our consciousness calls this the right way. Take out a valve, throw a wheel out of gear or bend a pivot, and it becomes a different machine, acting just as fatally in another way which we call the wrong way. But the machine itself knows nothing of wrong or right: matter has no ideals to pursue. A locomotive will carry its train **[143]** through an open drawbridge as cheerfully as to any other destination.

A brain with part of it scooped out is virtually a new machine, and during the first days after the operation functions in a thoroughly abnormal manner. As a matter of fact, however its performances become from day to day more normal, until at last a practised eye may be needed to suspect anything wrong. Some of the restoration is undoubtedly due to 'inhibitions' passing away. But if the consciousness which goes with the rest of the brain, be there not only in order to take cognizance of each functional error, but also to exert an efficient pressure to check it if it be a sin of commission, and to lend a strengthening hand if it be a weakness or sin of omission, - nothing seems more natural than that the remaining parts, assisted in this way, should by virtue of the principle of habit grow back to the old teleological modes of exercise for which they were at first incapacitated. Nothing, on the contrary, seems at first sight more unnatural than that they should vicariously take up the duties of a part now lost without those *duties as such* exerting any persuasive or coercive force. At the end of Chapter XXVI I shall return to this again.

There is yet another set of facts which seem explicable on the supposition that consciousness has causal efficacy. *It is a well-known fact that pleasures are generally associated with beneficial, pains with detrimental, experiences*. All the fundamental vital processes illustrate this law. Starvation, suffocation, privation of food, drink and sleep, work when exhausted, burns, wounds, inflammation, the effects of poison, are as disagreeable as filling the hungry stomach, enjoying rest and sleep after fatigue, exercise after rest, and a sound skin and unbroken bones at all times, are pleasant. Mr. Spencer and others have suggested that these coincidences are due, not to any pre-established harmony, but to the mere action of natural selection which would certainly kill off in the long-run any breed of creatures to whom the fundamentally noxious experience seemed enjoyable. An animal that should take pleasure in a feeling **[144]** of suffocation would, if that pleasure were efficacious enough to make him immerse his

head in water, enjoy a longevity of four or five minutes. But if pleasures and pains have no efficacy, one does not see (without some such *à priori* rational harmony as would be scouted by the 'scientific' champions of the automaton-theory) why the most noxious acts, such as burning, might not give thrills of delight, and the most necessary ones, such as breathing, cause agony. The exceptions to the law are, it is true, numerous, but relate to experiences that are either not vital or not universal. Drunkenness, for instance, which though noxious, is to many persons delightful, is a very exceptional experience. But, as the excellent physiologist Fick remarks, if all rivers and springs ran alcohol instead of water, either all men would now be born to hate it or our nerves would have been selected so as to drink it with impunity. The only considerable attempt, in fact, that has been made to explain the *distribution* of our feelings is that of Mr. Grant Allen in his suggestive little work *Physiological Aesthetics;* and his reasoning is based exclusively on that causal efficacy of pleasures and pains which the 'double-aspect' partisans so strenuously deny.

Thus, them, from every point of view the circumstantial evidence against that theory is strong. *A priori* analysis of both brain-action and conscious action shows us that if the latter were efficacious it would, by its selective emphasis, make amends for the indeterminateness of the former; whilst the study *a posteriori* of the *distribution* of consciousness shows it to be exactly such as we might expect in an organ added for the sake of steering a nervous system grown too complex to regulate itself. The conclusion that it is useful is, after all this, quite justifiable. But, if it is useful, it must be so through its causal efficaciousness, and the automaton-theory must succumb to the theory of commonsense. I, at any rate (pending metaphysical reconstructions not yet successfully achieved), shall have no hesitation in using the language of common-sense throughout this book.

Footnotes

[1] The Theory of Practice, vol. I, p. 416 ff.

[2] The present writer recalls how in 1869, when still a medical student, he began to write an essay showing how almost every one who speculated about brain-processes illicitly interpolated into his account of them links derived from the entirely heterogeneous universe of Feeling. Spencer, Hodgson (in his Time and Space), Maudsley, Lockhart Clarke, Bain, Dr. Carpenter, and other authors were cited as having been guilty of the confusion. The writing was soon stopped because he perceived that the view which he was upholding against these authors was a pure conception, with no proofs to be adduced of its reality. Later it seemed to him that whatever *proofs* existed really told in favor of their view.

[3] Chas. Mercier: The Nervous System and the Mind (1888). p. 9.

[4] *Op. cit.* p. 11.

[5] See in particular the end of Chapter IX.