

DISCUSSION.

THE PHYSICAL BASIS OF EMOTION.

In the year 1884 Prof. Lange of Copenhagen and the present writer published, independently of each other, the same theory of emotional consciousness. They affirmed it to be the effect of the organic changes, muscular and visceral, of which the so-called 'expression' of the emotion consists. It is thus not a primary feeling, directly aroused by the exciting object or thought, but a secondary feeling indirectly aroused; the primary effect being the organic changes in question, which are immediate reflexes following upon the presence of the object.

This idea has a paradoxical sound when first apprehended, and it has not awakened on the whole the confidence of psychologists. It may interest some readers if I give a sketch of a few of the more recent comments on it.

Professor Wundt's criticism may be mentioned first.* He unqualifiedly condemns it, addressing himself exclusively to Lange's version. He accuses the latter of being one of those *psychologischen Scheinerklärungen* which assume that science is satisfied when a psychic fact is once for all referred to a physiological ground.

His own account of the matter is that the immediate and primary result of 'the reaction of Apperception † on any conscious-content' or object is a *Gefühl* (364). *Gefühl* is an unanalyzable and simple process corresponding in the sphere of *Gemüth* to sensation in the

* *Philosophische Studien*, VI. 349, (1891).

† In this article, as in the 4th edition of his *Psychology*, Wundt vaguely completes his *volte-face* concerning 'Apperception' and dimly describes the latter in associationist terms. "Apperception is nothing really separable from the effects which it produces in the content of representation. In fact it consists of nothing but these concomitants and effects. [A thing that 'consists' of its concomitants!] . . . In each single apperceptive act the entire previous content of the conscious life operates as a sort of integral total force" (364, 365), etc. The whole account seems indistinguishable from pure Herbartism, in which Apperception is only a name for the interaction of the old and the new in consciousness, of which interaction feeling may be one result.

sphere of intellection (359). But *Gefühle* have the power of altering the course of ideas—inhibiting some and attracting others, according to their nature; and these ideas in turn produce both secondary *Gefühle* and organic changes. The organic changes in turn set up additional *sinnliche Gefühle* which fuse with the preceding ones and strengthen the volume of feeling aroused. This whole complex process is what Wundt calls an *Affect* or Emotion—a state of mind which, as he rightly says, ‘has thus the power of intensifying itself’ (358–363). I shall speak later of what may be meant by the primary *Gefühl* thus described. Wundt in any case would seem to be certain both that it is the essential part of the emotion, and that currents from the periphery cannot be its organic correlate. I should say, granting its existence, that it falls short of the emotion proper, since it involves no *commotion*, and that such currents *are* its cause. But of these points later on. The rest of Wundt’s criticism is immaterial, dealing exclusively with certain rash methodological remarks of Lange’s; emphasizing the ‘parallelism’ of the psychical and the physical; and pointing out the vanity of seeking in the latter a causal explanation of the former. As if Lange ever pretended to do this in any intimate sense! Two of Wundt’s remarks, however, are more concrete.

How insufficient, he says, must Lange’s explanation of emotions from vaso-motor effects be, when it results in making him put joy and anger together in one class! To which I reply both that Lange has laid far too great stress on the vaso-motor factor in his explanations, and that he has been materially wrong about congestion of the face being the essential feature in anger, for in the height of that passion almost every one grows pale—a fact which the expression ‘white with rage’ commemorates. Secondly, Wundt says, whence comes it that if a certain stimulus be what causes emotional expression by its mere reflex effects, another stimulus almost identical with the first will fail to do so if its *mental* effects are not the same? (355). The mental motivation is the essential thing in the production of the emotion, let the ‘object’ be what it may.

This objection, in one form or another, recurs in all the published criticisms. “Not the mere object as such is what determines the physical effects,” writes Mr. D. Irons in a recent article* which, if it were more popularly written, would be undeniably effective, “but the subjective feeling towards the object. . . . An emotional class is not something objective; each subject to a great extent classifies in this regard for itself, and even here time and circumstance make alteration

* Professor James’s Theory of Emotion, Mind, p. 78, 1894.

and render stability impossible. . . . *If I were not afraid, the object would not be an object of terror*" (p. 84). And Dr. W. L. Worcester, in an article * which is both popularly written and effective, says: "Neither running nor any other of the symptoms of fear which he [W. J.] enumerates is the necessary result of seeing a bear. A chained or caged bear may excite only feelings of curiosity, and a well-armed hunter might experience only pleasurable feelings at meeting one loose in the woods. It is not, then, the perception of the bear that excites the movements of fear. We do not run from the bear unless we suppose him capable of doing us bodily injury. Why should the expectation of being eaten, for instance, set the muscles of our legs in motion? 'Common-sense' would be likely to say that it was because we object to being eaten; but according to Professor James the reason we dislike to be eaten is because we run away" (287).

A reply to these objections is the easiest thing in the world to make if one only remembers the force of association in psychology. 'Objects' are certainly the primitive arousers of instinctive reflex movements. But they take their place, as experience goes on, as elements in total 'situations,' † the other suggestions of which may prompt to movements of an entirely different sort. As soon as an object has become thus familiar and suggestive, its emotional consequences, *on any theory of emotion*, must start rather from the total situation which it suggests than from its own naked presence. But whatever be our reaction on the situation, in the last resort it is an instinctive reaction on that one of its elements which strikes us for the time being as most vitally important. The same bear may truly enough excite us to either fight or flight, according as he suggests an overpowering 'idea' of his killing us, or one of our killing him. But in either case the question remains: Does the emotional excitement which follows the idea follow it immediately, or secondarily and as a consequence of the 'diffusive wave' of impulses aroused?

Dr. Worcester finds something absurd in the very notion of acts constituting emotion by the consciousness which they arouse. How is it, he says, with voluntary acts? "If I see a shower coming up and run for a shelter, the emotion is evidently of the same kind, though perhaps less in degree, as in the case of the man who runs from the bear. According to Professor James, I am afraid of getting wet because I run. But suppose that instead of running I step into a shop and buy

* Observations on some points in James's *Psychology*. II. Emotion.—*The Monist*, vol. III. p. 285 (1893).

† In my nomenclature it is the total situation which is the 'object' on which the reaction of the subject is made.

an umbrella. The emotion is still the same. I am afraid of getting wet. Consequently, so far as I can see, the fear in this case consists in buying the umbrella. Fear of hunger, in like manner, might consist in laying in a store of provisions ; fears of poverty in shovelling dirt at a dollar a day, and so on indefinitely. Anger, again, may be associated with many other actions than striking. Shylock's anger at Antonio's insults induced him to lend him money. Did the anger . . . consist in the act of lending the money?" (291). I think that all the force of such objections lies in the slapdash brevity of the language used, of which I admit that my own text set a bad example when it said 'we are frightened because we run.' Yet let the word 'run' but stand for what it was meant to stand for, namely, for many other movements in us, of which invisible visceral ones seem by far the most essential ; discriminate also between the various grades of emotion which we designate by one name, and our theory holds up its head again. 'Fear' of getting wet is not the same fear as fear of a bear. It may limit itself to a prevision of the unpleasantness of a wet skin or of spoiled clothes, and this may prompt either to deliberate running or to buying an umbrella with a very minimum of properly emotional excitement being aroused. Whatever the fear may be in such a case it is not constituted by the voluntary act.* Only the details of the concrete case can inform us whether it be, as above suggested, a mere ideal vision of unpleasant sensations, or whether it go farther and involve also feelings of reflex organic change. But in either case our theory will cover all the facts.

Both Dr. Worcester and Mr. Irons are struck by this variability in the symptoms of any given emotion ; and holding the emotion itself to be constant, they consider that such inconstant symptoms cannot be its cause. Dr. Worcester acutely remarks that the actions accompanying all emotions tend to become alike in proportion to their intensity. People weep from excess of joy ; pallor and trembling accompany extremes of hope as well as of fear, etc. But, I answer, do not the subject's feelings also then tend to become alike, if considered in themselves apart from all their differing intellectual contexts? My theory maintains that they should do so ; and such reminiscences of extreme emotion as I possess rather seem to confirm than to invalidate such a view.

In Dr. Lehmann's highly praiseworthy book, 'Die Hauptgesetze des menschlichen Gefühlslebens,' † much is said of Lange's theory ; and in

* When the running has actually commenced, it gives rise to *exhilaration* by its effects on breathing and pulse, etc., in this case, and not to *fear*.

† Leipzig, 1899.

particular this same alleged identity of the emotion in the midst of such shifting organic symptoms seems to strike the critic as a fact irreconcilable with its being true. The emotion ought to be different when the symptoms are different, if the latter *make* the emotion; whereas if we lay a primary mental feeling at its core its constancy with shifting symptoms is no such hard thing to understand (p. 120). *Some* inconstancy in the mental state itself, however, Dr. Lehmann admits to follow from the shifting symptoms; but he contrasts the small degree of this inconstancy in the case of 'motived' emotions where we have a recognized mental cause for our mood, with its great degree where the emotion is 'unmotived,' as when it is produced by intoxicants (alcohol, haschisch, opium) or by cerebral disease, and changes to its opposite with every reversal of the vaso-motor and other organic states. I must say that I cannot regard this argument as fatal to Lange's and my theory so long as we remain in such real ignorance as to what the subjective variations of our emotions actually are. Exacter observation, both introspective and symptomatic, might well show in 'motived' emotions also just the amount of inconstancy that the theory demands.

Mr. Irons actually accuses me of self-contradiction in admitting that the symptoms of the same emotion vary from one man to another, and yet that the emotion has them for its cause. How can any definite emotion, he asks, exist under such circumstances, and what is there then left to give unity to such concepts as anger or fear at all (82)? The natural reply is that the bodily variations are within limits, and that the symptoms of the angers and of the fears of different men still preserve enough *functional* resemblance, to say the very least, in the midst of their diversity to lead us to call them by identical names. Surely there *is* no definite affection of 'anger' in an 'entitative' sense.

Mr. Irons finds great difficulty in believing that both intellectual and emotional states of mind, both the cognition of an object and the emotion which it causes, contrasted as they are, can be due to such similar neural processes, viz., currents from the periphery, as my theory assumes. "How," he asks, "can one perceptive process of itself suffuse with emotional warmth the cold intellectuality of another? . . . If perceptions can have this warmth, why is it the exclusive property of perception of organic disturbance (85.)?" I reply in the first place that it is not such exclusive property, for all the higher senses have warmth when 'æsthetic' objects excite them. And I reply in the second place that even if secondarily aroused visceral thrills were the only objects that had warmth, I should see no difficulty in accepting the fact. This writer further lays great stress on the vital difference between

the receptive and the reactive states of the mind, and considers that the theory under discussion takes away all ground for the distinction. His account of the inner contrast in question is excellent. He gives the name of 'feeling-attitude' to the whole class of reactions of the self, of which the experiences which we call emotions are one species. He sharply distinguishes feeling-attitude from mere pleasure and pain—a distinction in which I fully agree. The line of direction in feeling-attitude is from the self outward, he says, while that of mere pleasure and pain (and of perception and ideation) is from the object to the self. It is impossible to feel pleasure or pain *towards* an object; and common language makes a sharp distinction between being pained and having bad feelings towards somebody in consequence. These attitudes of feeling are almost indefinitely numerous; some of them must always intervene between cognition and action, and when in them we feel our whole Being moved (93-96). Of course one must admit that any account of the physiology of emotion that should be inconsistent with the possibility of this strong contrast within consciousness would thereby stand condemned. But on what ground have we the right to affirm that visceral and muscular sensibility cannot give the direction from the self outwards, if the higher senses (taken broadly, with their ideational sequelæ) give the direction from the object to the self? We do, it is true, but follow a natural analogy when we say (as Fouillée keeps saying in his works on *Idees-forces*, and as Ladd would seem to imply in his recent *Psychology*) that the former direction in consciousness ought to be mediated by outgoing nerve-currents, and the latter by currents passing in. But is not this analogy a mere superficial fancy, which reflection shows to have no basis in any existing knowledge of what such currents can or cannot bring to pass? We surely know too little of the psycho-physic relation to warrant us in insisting that the similarity of direction of two physical currents makes it impossible that they should bring a certain inner contrast about.

Both Dr. Worcester and Mr. Irons insist on the fact that consciousness of bodily disturbance, taken by itself, and apart from its combination with the consciousness of an exciting object, is not emotional at all. "Laughing and sobbing, for instance," writes the former, "are spasmodic movements of the muscles of respiration, not strikingly different from hiccoughing; and there seems no good reason why the consciousness of the former two should usually be felt as strong emotional excitement while the latter is not. . . . Shivering from cold, for instance, is the same sort of a movement as may occur in violent fright but it does not make us feel frightened. The laughter excited in children and sensitive persons by tickling of the skin is not neces-

sarily accompanied by any mirthful feelings. The act of vomiting may be the accompaniment of the most extreme disgust, or it may occur without a trace of such emotion" (289). The facts must be admitted; but in none of these cases where an organic change gives rise to a mere local bodily perception is the reproduction of an emotional diffusive wave complete. Visceral factors, hard to localize, are left out; and these seem to be the most essential ones of all. I have said that where they also from any inward cause are added, we *have* the emotion; and that then the subject is seized with objectless or pathological dread, grief, or rage, as the case may be. Mr. Irons refuses to accept this interpretation. The bodily symptoms do not here, he says, when felt, constitute the emotion. In the case of fear they constitute rather the object of which we are afraid. We fear *them*, on account of their unknown or indefinite evil consequences. In the case of morbid rage, he suggests, the movements are probably not the expression of a genuine inner rage, but only frantic attempts to relieve some inward pain, which outwardly look like rage to the observer (80). These interpretations are ingenious, and may be left to the reader's judgment. I confess that they fail to convert me from my own hypothesis.*

Messrs. Irons and Wundt (and possibly Baldwin and Sully, neither of whom accept the theory in dispute, but to whose works I have not access where I write, so that I cannot verify my impression) think that the theory carries with it implications of an objectionable sort philosophically. Irons, for example, says that it belongs to a psychology in which feeling can have no place, because it ignores the self and its unity, etc. (92). In my own mind the theory has no philosophic implications whatever of a general sort. It assumes (what probably every one assumes) that there must be a process of some sort in the nerve-

* Mr. Irons elsewhere says that "an object on being presented suddenly may cause intense fear. On being recognized as familiar the terror may vanish instantly, and while the mental mood has changed, for a measurable time at least, all the bodily effects of the former state are present" (86). Their dying phase certainly is present for a while; but *has* the emotion then 'vanished instantly'? I should rather say that there is then a very mixed emotional state, in which something of the departing terror still blends with the incoming joy of relief. The case of waking from nightmare is for us civilizees probably the most frequent experience in point. On such occasions the horror with me is largely composed of an intensely strong but indescribable feeling in my breast and in all my muscles, especially those of the legs, which feel as if they were boiled into shreds or otherwise inwardly decomposed. This feeling fades out slowly and until it is gone the horror abides, in spite of the fact that I am already enjoying the incomplete relief which comes of knowing that the bad experience is a dream, and that the horror is on the wane. It were much to be wished that many persons should make observations of this sort, for individual idiosyncrasy may be great.

centres for emotion, and it simply defines that process to consist of afferent currents. It does this on no general theoretic grounds, but because of the introspective appearances exclusively.

The objective qualities with which perception acquaints us are considered by psychologists to be results of sensation. When these qualities affect us with pleasure or displeasure, we say that the sensations have a 'tone of feeling.' Whether this tone be due to a mere form of the process in the nerve of sense, as some authors (e.g. Mr. Marshall) think, or to additional specific nerves, as others (e.g. Dr. Nichols) opine, is immaterial. The pleasantness or unpleasantness, once there, seems immediately to inhere in the sensible quality itself. They are beaten up together in our consciousness. But in addition to this pleasantness or painfulness of the content, *which in any case seems due to afferent currents*, we may also feel a general seizure of excitement, which Wundt, Lehmann, and other German writers call an *Affect*, and which is what I have all along meant by an emotion. Now whenever I myself have sought to discover the mind-stuff of which such seizures consist, it has always seemed to me to be additional sensations often hard to describe, but usually easy to identify, and localized in divers portions of my organism. In addition to these sensations I can discern nothing but the 'objective content' (taking this broadly so as to include judgments as well as elements judged), together with whatever agreeableness or disagreeableness the content may come tinged by.* *Such*

* The disagreeableness, etc., is a very mild affection, not drastic or grasping *in se* in the case of any objective content except localized bodily *pain*, properly so called. Here the feeling seems in itself overpowering in intensity apart from all secondary emotional excitement. But I think that even here a distinction needs to be made between the primary consciousness of the pain's *intrinsic quality*, and the consciousness of its degree of *intolerability*, which is a secondary affair, seeming connected with reflex organic irradiations. I recently, while traversing a little surgical experience, had occasion to verify once more the fact that it is not the mere *bigness* of a pain that makes it most unbearable. If a pain is honest and definite and well localized it may be very heavy and strong without taxing the extreme of our endurance. But there are pains which we feel to be faint and small in their intrinsic amount, but which have something so poisonous and non-natural about them that consent to their continuance is impossible. Our whole being refuses to suffer them. These pains produce involuntary shrinkings, writhings, sickness, faintness, and dread. For such emotion superadded to the pain itself there is no distinctive name in English. Prof. Münsterberg has distinguished between *Schmerz* as an original 'content' of consciousness and *Unlust* as due to flexor reactions provoked thereby; and before his Essay appeared, I remember hearing Dr. D. S. Miller and Dr. Nichols maintain in conversation that painfulness may be always a matter of 'intolerability,' due to the reflex irradiations which the painful object may arouse. Thus might even the mildest *Gemütsvorgänge* be brought under the terms of my theory.

organic sensations being also presumably due to incoming currents, the result is that the whole of my consciousness (whatever its inner contrasts be) seems to me to be outwardly mediated by these. This is the length and breadth of my 'theory'—which, as I apprehend it, is a very unpretending thing.

It may be, after all, that the difference between the theory and the views of its critics is insignificant. Wundt admits tertiary feelings, due to organic disturbance, which must fuse with the primary and secondary feelings before 'we can have an 'Affect;,' Lehmann writes: "Constrained by the facts, we are obliged to concede to the organic sensations and tones of feeling connected with them an essential participation in emotion (*wesentliche Bedeutung für die Affecte*") (p. 115); and Professor Ladd also admits that the 'rank' quality of the emotions comes from the organic repercussions which they involve. So far, then, we are all agreed; and it may be admitted, in Dr. Worcester's words, that the theory under attack 'contains an important truth,' and even that its authors have 'rendered a real service to psychology' (p. 295). Why, then, is there such strong opposition? When the critics say that the theory still contradicts their consciousness (Worcester, p. 288), do they mean that introspection acquaints them with a part of the emotional excitement which it is psycho-physically impossible that incoming currents should cause? Or, do they merely mean that the part which introspection can *localize* in the body is so small that when abstracted a large mass of unlocalizable emotion remains? Although Mr. Irons professes the former of these two meanings, the only prudent one to stand by is surely the latter; and here, of course, every man will hold by his own consciousness. I for one shall never deny that individuals may greatly differ in their ability to localize the various elements of their organic excitement when under emotion. I am even willing to admit that the primary *Gefühlston* may vary enormously in distinctness in different men. But speaking for myself, I am compelled to say that the only feelings which I cannot more or less well localize in my body are very mild and, so to speak, platonic affairs. I allow them hypothetically to exist, however, in the form of the 'subtler' emotions, and in the mere intrinsic agreeableness and disagreeableness of particular sensations, images, and thought-processes, where no obvious organic excitement is aroused.*

* Mr. Irons contends that in admitting 'subtler' forms of emotion, I throw away my whole case (88, 89); and Dr. Lehmann enters into an elaborate argument to prove (as he alleges, against Lange and me) that primary feeling, as a possible accompaniment of any sensation whatever, must be admitted to exist (§§ 157-164). Such objections are a complete *ignoratio elenchi*, addressed to some imaginary

This being the case, it seems almost as if the question had become a verbal one. For which sort of feeling is the *word* 'emotion' the more proper name—for the organic feeling which gives the rank character of commotion to the excitement, or for that more primary pleasure or displeasure in the object, or in the thought of it, to which commotion and excitement do not belong? I myself took for granted without discussion that the word 'emotion' meant the rank feeling of excitement, and that the special emotions were names of special feelings of excitement, and not of mild feelings that might remain when the excitement was removed. It appears, however, that in this assumption I reckoned without certain of my hosts.

Dr. Worcester's quarrel with me at the end of his article becomes almost exclusively verbal. All pleasure and pain, he says, whether primary and of the higher senses and intellectual products, or secondary and organic, should be called 'emotion' (296).^{*} Pleasure or pain revived in idea, as distinguished from vivid sensuous pleasure and pain, he suggests to be what is meant by emotion 'in the sense in which the word is commonly used' (297); and he gives an array of cases in point :

"Suppose that I have taken a nauseous dose and made a wry face over it. No one, I presume, would question that the disagreeableness lay in the unpleasant taste, and not in the distortion of the countenance. Now suppose I have to repeat the dose, and my face takes on a similar expression, at the anticipation, to that which it wore when I took it originally. How does this come about? If I can trust my own consciousness, it is because the vivid reproduction, in memory, of the unpleasant taste is itself unpleasant. . . . If this be the fact, what can be more natural than that it should excite the same sort of associated movements that were excited by the original sensation? I cannot make it seem any more credible that my *repugnance* to a repetition of the dose is due to my involuntary movements than my discomfort in taking it originally was due to the similar movements that occurred then. . . . I hardly think that any one who will consult his own consciousness will say that the reason he likes the taste of an orange is that it makes him laugh or smile to get it. He *likes* it because it tastes good, and is sorry to lose it for the same reason." (*Ibid.*)

theory with which my own, as I myself understand it, has nothing whatever to do, all that I have ever maintained being the dependence on incoming currents of the *emotional seizure* or *Affect*.

^{*} 'The essence of emotion is pleasure and pain,' he adds. This is a hackneyed psychological doctrine, but on any theory of the seat of emotion it seems to me one of the most artificial and scholastic of the untruths that disfigure our science. One might as well say that the essence of prismatic color is pleasure and pain. There are infinite shades and tones in the various emotional excitements, which are as distinct as sensations of color are, and of which one is quite at a loss to predicate either pleasant or painful quality.

Now, accepting Dr. Worcester's description of the facts, I remark immediately that the nauseousness and pleasantness are due to incoming nerve-currents—at any rate in the cases which he selects—and the feeling of the involuntary movements as well; so whatever name we give to the phenomena, so far they fall comfortably under the terms of my theory. The only question left over is what may be covered by the words 'repugnance' and 'liking,' which I have italicized, but which Dr. Worcester does not emphasize, as he describes his instances. Are *these* a third sort of affection, *not* due to afferent currents, and interpolated between the gustatory feelings and reactions which are so due? Or are they a name for what, when carefully considered, resolves itself into more delicate reactions still? I privately incline to the latter view, but the whole *animus* of my critic's article obliges me to attribute to him the opinion, not only that the like and dislike must be a third sort of affection not grounded on incoming currents, but that they form the distinctive elements of the 'emotional' state of mind.

The whole discussion sharpens itself here to a point. We can leave the lexicographers to decide which elements the word 'emotional' belongs to; for our concern is with the facts, and the question of fact is now very plain. Must we (under any name) admit as an important element in the emotional state of mind something which is distinct both from the intrinsic feeling-tone of the object and from that of the reactions aroused—an element of which the 'liking' and 'repugnance' mentioned above would be types, but for which other names may in other cases be found? The belief that some such element does exist, and exist in vital amount, is undoubtedly present in the minds of all the rejectors of the theory in dispute. Dr. Worcester rightly regrets the deadlock when one man's introspection thus contradicts another's (288), and demands a more objective sort of umpire. Can such a one be found? I shall try to show now that it possibly has been found; and that Dr. Sollier's recent observations on complete anæsthetics show that in some persons at least the supposed third kind of mental element may exist, if it exists at all, in altogether inappreciable amount.

In my original article I had invoked cases of generalized anæsthesia, and admitted that if a patient could be found who, in spite of being anæsthetic inside and out, could still suffer emotion, my case would be upset. I had quoted such cases as I was aware of at the time of writing, admitting that so far as appearances went they made against the theory; but I had tried to save the latter by distinguishing between the objective reaction which the patient makes and the subjective feeling which it gives him. Since then a number of cases of

generalized anæsthesia have been published, but unfortunately the patients have not been interrogated from the proper point of view. The famous 'theory' has been unknown to the reporting doctors. Two such cases, however, described by Dr. Berkley of Baltimore,* are cited by Dr. Worcester 'for what they are worth' in its refutation (294). The first patient was an Englishwoman, with complete loss of the senses of pain, heat and cold, pressure and equilibrium, of smell, taste, and sight. The senses of touch and of position were not completely gone, but greatly impaired, and she could hear a little. As for visceral sensations, she had had no hunger or thirst for two years, but she was warned by feeling of the evacuative needs. She laughs at a joke, shows definitely grief, shame, surprise, fear, and repulsion. Dr. Berkley writes to Dr. Worcester as follows: "My own impression derived from observation of the patient, is that all mental emotional sensibilities are present, and only a little less vivid than in the unanæsthetic state; and that emotions are approximately natural and not at all coldly dispassionate."

The second case was that of a Russian woman with complete loss of cutaneous, and almost complete loss of muscular, sensibility. Sight, smell, hearing preserved, and nothing said of visceral sensation (in Dr. Worcester's citation). She showed anger and amusement, and not the slightest apathy.

This last case is obviously too incompletely reported to serve; and in the preceding one it will be noticed that certain degrees of visceral and of muscular sensibility remained. As these seem the important sorts emotionally, she may well have felt emotion. Dr. Berkley, however, writes of her 'apathy'; and it will be noticed that he thinks her emotions 'less vivid than in the unanæsthetic state.'

In Dr. Sollier's patient the anæsthesia was far more complete, and the patient was examined for the express purpose of testing the dependence of emotion on organic sensibility. Dr. Sollier, moreover, experimented on two other subjects in whom the anæsthesia was artificially induced by hypnotic suggestion. The spontaneous case was a man aged forty-four; the hypnotic cases were females of hysteric constitution.† In the man the anæsthetic condition extended so far that at present every surface, cutaneous and mucous, seems absolutely insensible. The muscular sense is wholly abolished; the feelings of hunger and satiety do not exist; the needs of defecation and micturition

* *Brain*, Part IV, 1891.

† The paper, entitled '*Recherches sur les Rapports de la Sensibilité et de l'Émotion*,' will be found in the *Revue Philosophique* for March of this year, vol. xxxvii. p. 241.

are unfelt; taste and smell are gone; sight much enfeebled; hearing alone is about normal. The cutaneous and tendinous reflexes are lacking. The physiognomy has no expression; speech, is difficult; the entire muscular apparatus is half paralyzed, so that locomotion is almost impossible.

“‘I know,’ this patient says, ‘that I have a heart, but I do not feel it beat, except sometimes very faintly.’ When an event happens which ought to affect it [the heart, as I understand the text], he fails equally to feel it. He does not feel himself breathe, or know whether he makes a strong or a weak inspiration. ‘I do not feel myself alive,’ he says. Early in his illness he several times thought himself dead. He does not know whether he is asleep or awake. . . . He often has no thoughts. When he does think of anything it is of his home or of the war of 1870, in which he took part. The people whom he sees come and go about him are absolutely indifferent to him. He does not notice what they do. ‘They do not appear,’ he says, ‘like natural men to me, but more like mechanisms.’ Similar perturbations of perception occur also in hearing. ‘I do not hear in the old way; it is as if it sounded in my ear, but did not enter into my head. It does not stay there long.’ His *aprosaxia* is complete, and he is incapable of interest in anything whatever. Nothing gives him pleasure. ‘I am insensible to everything; nothing interests me. I love nobody; neither do I dislike anybody.’ He does not even know whether it would give him pleasure to get well, and when I tell him that his cure is possible it awakens no reaction—not even one of surprise or doubt. The only thing that seems to move him a little is the visit of his wife. When she appears in the room ‘it gives me a stroke in the stomach,’ he says; ‘but as soon as she is there I wish her away again.’ He often has a fear that his daughter may be dead. If she should die I believe I should not survive her, although if I never were to see her again it would make no difference to me.’ His visual images are non-existent, and he has no representation of his wife when she is gone. The weakness of the sensations remaining to him gives him a sense of uncertainty about all things: ‘I am never sure of anything.’ Nothing surprises or astonishes him. His state of apathy, of indifference, of extreme emotionlessness, has developed slowly *pari passu* with the anæsthesia. His case realizes, therefore, as completely as possible the experiment desiderated by W. James.”

In the hypnotic experiments, Dr. Sollier provoked in his subjects sometimes visceral and sometimes peripheral anæsthesia, and sometimes both at once. He registered the organic reactions (by pneumograph, etc.) as far as possible, and compared them with those produced in the same subject when an emotion-exciting idea was suggested, first in the anæsthetic and then in the normal state. Finally, he questioned the subject on the impressions she had received. For the detailed results the reader must consult the original paper. I will only mention those which stem most important, as follows:

(1) Complete peripheral anæsthesia abolishes completely the power of movement. At the same time the limbs grow cold and sometimes blue (247).

(2) When visceral anæsthesia is added, the patient says she feels as if she no longer were alive (*ibia*).

(3) When totally anæsthetic she feels no normal emotion whatever at the suggestion of hallucinations and delusions which have the power of moving her strongly when the sensibility is restored. When the anæsthesia is less complete she may say that she feels not the usual emotion, but a certain stroke in the head or stomach at the reception of the moving idea (250, 254).

(4) When the anæsthesia is solely peripheral, the emotion takes place with almost normal strength.

(5) When it is solely visceral, the emotion is abolished almost as much as when it is total, so that the emotion depends almost exclusively on visceral sensations (258).

(6) There is sometimes a very slight motor reaction shown by the pneumograph in visceral anæsthesia when an exciting idea is suggested (Figs. 2, 7 *bis*), but M. Sollier thinks (for reasons of a highly speculative kind) that in complete *inmotivity* the visceral reactions themselves do not take place (265).

The reader sees that M. Sollier's experimental results go on the whole farther than 'my theory' ever required. With the visceral sensibility not only the 'coarser' but even the 'subtler' forms of emotion depart. Some people must then be admitted to exist in whom the amount of supposed feeling that is not due to incoming currents is a negligible quantity. Of course we must bear in mind the fallibility of experiments made by the method of 'suggestion.' We must moreover remember that the male patient's *inmotivity* may have been a co-ordinate result with the anæsthesia, of his neural lesions, and not the anæsthesia's mere effect. But nevertheless, if many cases like those of M. Sollier should be found by other observers, I think that Prof. Lange's theory and mine ought no longer to be treated as a heresy, but might become the orthodox belief. That part, if there be any, of emotional feeling which is not of afferent origin should be admitted to be insignificant, and the name 'emotion' should be suffered to connote organic excitement as the distinctive feature of the state.

WILLIAM JAMES.