

# THE MECHANISM OF THE EMOTIONS

Carl Georg Lange (1885/1912)

## ***Classics in the History of Psychology***

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**Carl Georg Lange (1885/1912)**

Translated by Benjamin Rand

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*[Classics Editor's note: This translation of a passage from Lange's Om Sindsbevaegelser (1885) from Lange's Ueber Gemüthsbewegungen. Eine psycho-physiologische Studie (1887), first appeared in Rand, Benjamin (Ed.)(1912). The Classical Psychologists (pp. 672-684). Boston: Houghton Mifflin. The page numbers included here are from the Rand edition.]*

We approach now the question which possesses a vital interest from the psycho-physiological standpoint, and for that reason forms the centre of this investigation. The question concerns the nature of the relation between the emotions and their accompanying bodily expressions.

Heretofore I have constantly used phrases, though under protest, such as "the physiological phenomena occasioned by the emotions," or "the physiological phenomena which accompany emotion," etc. I have employed provisionally these customary expressions for the relation in question in order to be understood. Strangely enough up to the present time this relation never has been in any way accurately defined. I know of no attempt to determine its exact nature. The matter is very simple in the popular conception. Here emotions are entities, substances, forces, daemons, which seize man and produce in him bodily as well as mental manifestations: "grief seized me," "a joy came to me," "anger controlled me," "fear overwhelmed me," etc.

As often happens in popular and sometimes even in scientific psychology, this conception has rather a metaphorical than an explicative value. Modern psychology would scarcely adopt it, [p.673] if it could offer in its place any more comprehensible or exact explanation. Most modern authors in the domain of scientific psychology do not enter [1] at all into this question. They appear almost deliberately to pass it over in silence, in order probably from the lack of a physiological explanation not to have recourse to the mysterious language of speculative psychology. Indeed one can say that scientific psychology also shares the theory, that the emotions induce and determine the accompanying bodily expressions. But as to what emotions strictly are, that they can have such power over the body, one seeks, I think, in vain for any explanation in the whole of modern psychology.

If we desire a clear understanding of the relation here discussed, we must, as it appears to me, formulate the problem approximately in the following way. We have in every emotion as certain and manifest factors: (1) a cause, -- a sense impression, which acts as a rule by the aid of

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memory, or of an associated idea; -- and thereafter (2) an effect, namely, the previously discussed vasomotor changes, and further, issuing from them, the changes in the bodily and mental functions.

The question now arises:

What lies between these two factors? Is there anything at all? If I begin to tremble because I am threatened with a loaded pistol, does first a psychical process occur in me, does terror arise, and is that what causes my trembling, palpitation of the heart, and confusion of thought; or are these bodily phenomena produced directly by the terrifying cause, so that the emotion consists exclusively of the functional disturbances in my body?

The answer to this question is, as one easily perceives, not merely of decisive significance for the psychology of the emotions; but also of the greatest practical significance for any physician, who has to do with the pathological results of violent emotions.

The current opinion, as already remarked, amounts to the [p. 674] statement, that the immediate effect of a process followed by an emotion is of a purely psychical nature, (therefore, either the creation of a new mental force, or the modification of a previous mental state). Furthermore, it affirms, that this event in the soul is the actual emotion, the true joy, sorrow, etc.; whereas the bodily phenomena are only subsidiary phenomena, which indeed are never lacking, but are nevertheless in and of themselves wholly unessential.

The purely psychical emotion is an hypothesis, and like every hypothesis, has its justification only if it fulfils two conditions: namely, (1) to explain the phenomena for which it is propounded, and (2) that it be necessary for the explanation of these phenomena.

Respecting the first of these conditions, the hypothesis in question has just as easy a task as all the metaphysical hypotheses in general have. Without being restricted by objections of experience, one can elaborate them at pleasure, attributing to them any quality or power, and without further difficulty they perform every service that is required of them. But can psychical terror explain why one grows pale, or why one trembles? Although we do not understand the explanation, we are still free to assume it, and we are accustomed to be therewith content.

If the hypothesis of the psychical nature of the emotions is accordingly unassailable at this point, (indeed more because it escapes, than because it stands criticism,) the question arises, whether it fulfils the second condition? Is it indispensable for the explanation of the group of phenomena which we call emotions? Can these phenomena be understood without its aid?

Whoever would make clear to some one who has grown up with the common idea upon this subject, that if he is frightened his terror is only a perception of change in his body, would probably encounter the following objection: "Any such assumption of this relation is decisively contradicted by personal experience, since we have in terror, as in every emotion, a perfectly distinct sensation of a peculiar change, or of a definite, psychical state, wholly independent of anything bodily." [p. 675]

I can readily understand, that this objection has very great significance for the majority, and is difficult to overcome. Nevertheless it has of course in and of itself not the least value.

We have in fact no absolute and immediate means of determining whether a sensation is of a psychical or bodily character. Furthermore, no one is able to indicate the difference between psychical and somatic feelings. Whoever speaks of a psychical impression does so indeed solely upon the basis of a theory, and not upon an immediate perception. Without doubt, the mother who sorrows over her dead child would resist, probably even become indignant, if anyone were to say to her, that what she feels, is the exhaustion and inertness of her muscles, the numbness in her bloodless skin, the lack of mental power for clear and rapid thought<sup>[2]</sup> -- all of which is made clear by the idea of the cause of these phenomena. There is no reason,

however, for her to be indignant, for her feeling is just as strong, as deep and pure, whether it springs from the one, or the other source. But it cannot exist without its bodily attributes.

If from one terrified the accompanying bodily symptoms are removed, the pulse permitted to beat quietly, the glance to become firm, the color natural, the movements rapid and secure, the speech strong, the thoughts clear, -- what is there left of his terror?

If we cannot rely, therefore, in this question upon the testimony of personal experience, because it is here incompetent, the matter is thereby naturally not yet explained. If the hypothesis of psychical emotions be not made necessary by subjective experience, it may nevertheless be requisite if without it one cannot perhaps understand how the bodily manifestations of the emotions come into existence.

We have consequently first to investigate, whether the bodily manifestations of the emotions can come into existence in [p. 676] purely bodily ways. If that is the case, the necessity of the psychical hypothesis is thereby removed.

In fact, it is not difficult to show from every day experience, which establishes and constantly verifies the truth, that emotions can be produced by many causes, which have nothing to do with movements of the mind; as on the other hand, that they can equally as well be checked and subdued by purely bodily means. It is known, though without clear consciousness of the true relation of things, that our entire mode of existence, our daily dietetics, has been formed during the course of generations essentially with the aim to promote the agreeable emotions, and to lessen or entirely to remove the painful. I will merely cite a single example, and that will serve to recall others. It is one of the oldest experiences of mankind "that wine maketh glad the heart of man;" and the power of spirituous beverages to combat the closely related states of grief and fear, and to replace them with joy and courage, has found an application, which is in and for itself natural enough, and would be unconditionally beneficial if the means did not possess in addition still other effects.

We all understand why Jeppe [3] drinks. It is because he will escape thereby from his conjugal troubles, and his fear of the master Erich. He will sing again, and recall the happy time when he was "in the militia." The glass makes him jovial and courageous, without the addition of a single pleasing or enlivening impression which could have any direct effect upon his mind, and without in the least forgetting his troubles or his enemies. All he wants is the influence of wine to view them in a manner different from the customary. He desires to impress his importance upon the sexton, and for once to chastise his wife. The alcohol has excited his vasomotor apparatus, has caused his heart to beat more rapidly and strongly, has enlarged his capillary ducts and thereby heightened his voluntary innervations, and as a consequence, he talks loudly, sings, and blusters, instead of lingering about, whimpering, and whining on the public way. He has the feeling of warmth, airiness, and [p. 677] strength, in place of his customary limpness and incapacity. His dull brain awakes again to new life by the quick circulation of blood, the thoughts come in a rush, old memories revive and displace the wonted feeling of his daily misery. And all this is due merely to a "peg" of spirits, the effect of which upon the circulation we can understand, and which has no need of the intervention of the mind to act upon the vasomotor centre.

All those who drink spirits have an experience of a similar nature to Jeppe's, and thus we have it in general among the means of enjoyment, in addition to the many arrangements that we make to procure for ourselves comfort and well being. So long as we remain within the easy and customary routine of daily life, the connection between our emotional states and material influences, (e.g., nutrition), naturally comes only rarely into the foreground. The relation is otherwise in the enjoyment of certain substances, which act upon the body so powerfully that they are employed like drugs, or are ranked under the category of poisons. Thus it is known that the eating of certain fungi, especially the fly agaric, can produce the most violent paroxysms of fury, and of violence. It has been conjectured that our warlike ancestors used such means to create the right mood for martial enterprises; therefore entirely similar to the way, in which one to-day drinks spirits to "revive courage." Fits of temper also often follow the

partaking of hashish (indian hemp), which, ordinarily however like alcohol and opium, evokes a vivacious disposition, even outbursts of unbounded merriment.

Certain emetics, as ipecacuanha and tartar emetic, produce a feeling of depression, which oftentimes resembles fear, sometimes also grief, and like these emotions is accompanied by symptoms of collapse.

If emotional states can be precipitated by the enjoyment of certain substances, or in other purely bodily ways, it follows that one can combat and abate painful emotions in the same way. If spirits or opium produce joy, they are an antidote for sorrow.

The power of cold water to subdue temper and outbreaks of passion finds occasionally a practical use, and can, when applied to the body, scarcely act directly upon the mind; but so much the more does it act upon the vasomotor functions. By the agency of a medicine, the well-known bromide of potassium, which causes paralysis of the vasomotor apparatus, we have it in our power not only to allay fear and anxiety, and similar uncomfortable emotions, but also, if we wish, to cause a perfectly apathetic condition, in which the individual is even as little able to become festive or sad, as anxious and angry, simply because the vasomotor functions are suspended.

If the theory of the nature of the emotions here advocated, is well founded, we may in a general way expect that every action connected with functional changes of the vasomotor system must also have an emotional expression. Naturally we should not expect that emotions originated in this way would conform in every way with the phenomenon for which we commonly reserve this designation; the differences in the causes naturally must find expression in this domain through differences in the effects. The different psychical causes have also in reality effects which are not at all congruous. The fear of ghosts is not imagined in the same form as fear of the bullets of an enemy. Nevertheless, the similarity in many cases between the bodily and the psychically conditioned emotions has been sufficiently striking to force itself upon immediate apprehension, as the many linguistic designations clearly prove. Thus in all languages there is one and the same expression for mental and bodily pain. We have recognized their great physiological similarity, although the marked phenomenon of bodily pain, namely the subjective sensation in consequence of the transmission of the peripheral stimulus to the sensorium, is lacking in the case of mental pain. The cause of similarity of the physical to the emotional pain is the reflex innervation of the vascular nerves, a normal effect of every rather strong stimulation of the sensitive nerves.

The term *shudder*, in this way, is the common designation in speech for the phenomena arising from the sudden effects of cold upon the skin, and also from terrifying impressions. That [p. 679] the naïve intelligence recognizes no distinction between the shuddering due to emotional, and that due to purely bodily causes, we perceive in the fairy tale of the youth, who went forth in order to find out what shuddering was, and who after seeking in vain to discover it in the company of the dead and of ghosts, had his wish fulfilled when he was thrown from his bed into a tub of ice cold water, which produced a more painful effect upon his vasomotor apparatus than the sight of corpses, and of ghosts.

The designation *feverish* for the man who is very impatient, likewise shows, that we have been impressed by the similarity which exists between the light symptoms of fever with their vasomotor disturbances, and those bodily conditions which are produced by disquieting expectations.

As already remarked, I shall not enter in this small treatise more minutely into the large question concerning the relation of the emotions with the corresponding pathological states, or with mental and bodily diseases.

But there exists in this connection a relation which I cannot pass entirely by, because it throws much light upon the question with which we are here occupied, that is, the necessity of the hypothesis of purely psychical emotions. If there is anything that in a striking way can prove the

superfluous nature of this hypothesis, it is certainly the circumstance that the emotions arise without being evoked by any external impression, or by any occurrence which acts upon our mental life, or by any memory or association of ideas; and that they originate in optima forma solely upon the basis of the pathological conditions, which are developed in our bodies, or are inherited from parents.

If we set out from the theory here advocated this cannot be astonishing; for the vasomotor apparatus can of course upon occasion become diseased as readily as any other portion of the nervous system, so that it functions in an abnormal manner, or cannot function at all. We may even regard it as especially exposed to the danger of functioning in a pathological manner, because it is that part of the nervous system which has least rest and is most frequently liable to functional disturbances. [p. 680]

Where this happens in an individual, he becomes according to circumstances, depressed or distracted, anxious or unrestrainedly merry, embarrassed, etc. Everything is without apparent motive, and even though he is conscious of having no reason whatever for his anger, his fear, or his joy. Where is there any support here for the hypothesis of psychical emotion?

Such cases are extraordinarily frequent. Every alienist knows the sharply developed forms which appear as melancholia or mania; every physician who occupies himself at all thoroughly with nervous diseases has ample opportunity to observe the even more instructive light forms on the borderland between the real diseases of the mind and mere depressions, such as are included under the ordinary names of irritability, oddity, and dejection. Very frequently we find the dejection, the imaginary grief, or even despair, which often results in suicide, combined with clear consciousness of the entire absence of a single psychical motive for grief. Not much less frequent is the pathological anxiety, which often accompanies that related emotion of grief, but often enough is found alone. It goes without saying, that joy appears more rarely in actual pathological manifestations. The mere circumstance that a joy appears without motive will naturally, at least among the laity, seldom suffice to cause it to be regarded as pathological, and still less to cause medical treatment to be sought for the cure of this state. For such action it will be commonly necessary, that either the joy manifest itself in an entirely unrestrained and immoderate manner in the form of a more or less pronounced mania, or that it alternate in a striking fashion with periods of dejection, and thus attract attention as something unnatural. The same holds true of anger. We are in fact accustomed, as regards this emotion, to put up with a good deal without surmising it to be anything pathological, and as a rule we are not exacting as to its cause. But everything indeed has its limits, and there are outbreaks of anger often enough so groundless and unrestrained, that all will agree in recognizing them as manifestations of a pathological state.

There exists probably for those who have no medical training [p. 681] scarcely anything that can be more clarifying with reference to the diseased states of the mind here discussed, than the observation of such a pathological paroxysm of temper. Especially is this true, if it appears wholly uncomplicated by other psychical disturbances, as is the case in the form of illness which goes by the name of "transitory mania," and is indeed of rare occurrence. The attack comes often without the least apparent cause to an otherwise entirely sane person, if disposed thereto; and throws him -- to use the language of a recent writer<sup>[4]</sup> upon this disease -- into a state of wild paroxysm of rage, accompanied by a terrible and blindly furious impulse to injure and to destroy. The patient suddenly assails everything, strikes, kicks, and strangles whomsoever he can seize, throws everything about him that he can lay hands upon, breaks to pieces whatever comes near him, rends his clothes, screams, howls and roars with glaring rolling eyes, and thereby exhibits all the symptoms of vasomotor congestion which we have come to recognize as the accompaniment of madness. The face is flushed and swollen, the cheeks are hot, the eyes are bulging, their conjunctiva are filled with blood, the beating of the heart is increased, and the pulse reaches 100-120 strokes a minute. The neck arteries swell and throb, the veins are distended, the saliva flows. The fit lasts only a few hours, ends suddenly in a sleep of eight to ten hours duration, and upon waking the patient has entirely forgotten what has happened.

The pathological emotions here mentioned, which originate as stated from abnormal bodily conditions, can appear also as the results of other diseases, or proceed from digestive derangements. They are on that account influenced also by therapeutic methods, and can be alleviated or cured. The transitory mania above described, which has so evidently its cause in a sudden congestion of the brain, can, according to the author cited, be checked oftentimes by a bandage of ice upon the head.

I foresee here an objection which I shall not pass unnoticed in spite of its logical weakness. Undoubtedly many will say, in harmony with common usage, that the states which are occasioned [p. 682] by purely bodily influences, or by diseased bodily conditions, can indeed be similar to the emotions, but they are not emotions. For example, the delirium that the fly agaric occasions, or that appears in mania, presents indeed the picture of rage, but is not "actual" rage, any more than the happiness which comes from drinking wine is "real" happiness. One cannot for that reason conclude from the absence of moral wrath in the person poisoned by fly agaric or possessed of a mania, that there does not exist at all any such purely psychical state, provided the wrath is brought about in the ordinary way by a moral impression.

It is easy to see that any such division of emotions into real and apparent, or any such limitation of the domain of real emotions is entirely arbitrary, and based upon a *petitio principii*. The reason of the claim to an exceptional position for the emotions of intellectual origin, as if they were the only real ones, is purely and solely the belief, that they are due to the activity of the mind. But that is precisely the question under discussion.

In reality the difference between the passion of the warrior frenzied by the fly agaric, or of the maniac, and of one who has suffered a mortal offence, exists only in the difference and in the consciousness of the respective causes, or in the absence of the consciousness of any cause. If one desires upon this basis to establish a distinction, there is naturally no objection to be made, provided only one is clear wherein the difference consists.

Moreover it is not so easy, as it probably appears, to draw a sharp line of distinction between material and psychical causes of emotion; if we seek to analyse their physiological difference, it resolves itself into something physiologically quite irrelevant, and slips from our grasp.

No one has ever thought of distinguishing a true emotion from one produced by an uncommonly loud noise. No one hesitates to regard it as a sort of fright; and in fact it shows all the usual characteristics of fright. And yet it is by no means united with the idea of danger, or in any way occasioned by an association of ideas, a memory, or any intellectual process whatever. The phenomena of fright follow the noise immediately without [p. 683] a trace of "mental" fear. Merely because of the noise of the report, many persons can never become accustomed to stand beside a cannon when it is discharged, although they know perfectly well there is no danger, either for themselves or for others. The case, moreover, of the infant can be cited, which exhibits all the symptoms of fear whenever it hears a loud noise, and yet we cannot reasonably assume that the sound excited in the child any idea of danger. In this case, we must assume that if the vasomotor reflexes are not directly caused by the acoustic nerves, they are at least by the direct action of the acoustic centres, and we have therefore an emotion of purely material origin.<sup>[5]</sup> We must therefore either exclude this fear from the true emotions, or we cannot strictly maintain the distinction between the mentally and the bodily conditioned emotions.

We are placed in the same dilemma by the emotions, as a rule certainly less intensive but nevertheless sufficiently distinct, which are produced by the simple impressions of the other sense organs, and are not united with any kind of association. Such are, for example, the pleasure from a charming color or combination of colors, the repugnance towards a disagreeable taste or odor, or the discomfort from a pain.

If one has only once begun to feel uncertain about the establishment of a line of demarcation between the mental and bodily causes of emotions, there arises a strong impulse to investigate what physiological significance can be attributed to their difference. One seeks then what

difference exists in the cerebral mechanism of the emotions, according as they are determined by a so-called mental cause, or by one purely material.

To-day with our still very imperfect knowledge of cerebral physiology, it is certainly not very tempting to make an attempt at an explanation of what takes place in the brain as the result of mental work. Naturally, we can only sketch some fundamental outlines very roughly, and, in truth, with every [p. 684] possible reserve with reference to the accuracy of the results. Nevertheless, in psychological investigations it is not only justifiable, but is also correct and useful to examine how closely we can approach a solution with our present physiological knowledge. At all events we can take courage from the fact, that we know the relations here discussed - in their chief characteristics at least - are of their kind almost the simplest, and the easiest to fathom.[6]

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## Footnotes

[1] The external movement springs always from the inner, the emotion. Wundt's *Ueber den Ausdruck der Gemüthsbewegungen*. Deutsche Rundschau, April, 1877.

[2] I will not be deterred by the fact that it will probably be objected that one can feel pure psychical grief, joy, etc. if the emotion is not strong enough to lead to bodily symptoms. Such a supposition naturally rests only upon insufficient observation, or because one regards purely subjective sensations -- those of lightness or pressure, of strength or weakness -- as psychical.

[3] Jeppe am Bege, a character in the classical comedy of Holberg.

[4] O. Schwarz, *Die transitorische Tobsucht*, Wien, 1880.

[5] That we here deal with a simple reflex, immediately produced in the motor nerves, as Preyer appears to suppose (*Die Seele des Kindes*, 2te Aufl. p. 51) is not probable; partly because these motor phenomena have not in general the character of reflex movement excited by a sudden impression, and partly because the effects in question are not confined to motor phenomena.

[6] Translator's note: "The only point," says Th. Ribot in his *The Psychology of the Emotions*, "in which I differ from these authors [James and Lange] relates to their way of putting the proposition, not to its substance.

"It is evident that our two authors, whether consciously or not, share the dualist point of view with the common opinion which they are combating; the only difference being in the interversion of cause and effect. Emotion is a cause of which the physical manifestations are the effect, says one party; the physical manifestations are the cause of which emotion is the effect, says the other. In my view, there would be a great advantage in eliminating from the question every notion of cause and effect, every relation of causality, and in substituting for the dualistic position a unitary or monistic one. The Aristotelian formula of matter and form seems to me to meet the case better, if we understand by 'matter' the corporeal facts, and by 'form' the corresponding psychical state: the two terms, by-the-by, only existing in connection with each other and being inseparable except as abstract conceptions. It was traditional in ancient psychology to study the relations of 'the soul and the body' -- the new psychology does not speak of them. In fact, if the question takes a metaphysical form, it is no longer psychology; if it takes an experimental form, there is no reason to treat it separately, because it is treated in connection with everything. No state of consciousness can be dissociated from its physical conditions: they constitute a natural whole, which must be studied as such. Every kind of emotion ought to be considered in this way: all that is objectively expressed by the movements of the face and body, by vasomotor, respiratory, and secretory disturbances, is expressed subjectively by correlative states of consciousness, classed by external observation according



to their qualities. It is a single occurrence expressed in two languages. We have previously assimilated the emotions to psycho-physiological organisms; this unitary point of view, being more conformable to the nature of things and to the present tendencies of psychology, seems to me, in practice, to eliminate many objections and difficulties. Whether we adopt this theory or not, we have in any case acquired the certainty that the organic and motor manifestations are not accessories, that the study of them is part of the study of emotion." Pp. 111-112.

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