HEART DISEASE AND THE EMOTIONS.

tinction belongs to another science; this is a matter of expediency, and not to be decided by rigid definition. It would be well, however, always to make clear when we are within the strict domains of the science, and when we are digressing into attractive neighboring fields. Questions, for instance, as to the genetic relation between judgment and concept—whether judgments are developed out of concepts, or the reverse; as to the temporal order of premises and conclusion; as to whether we actually quantify the predicate (this is carefully to be distinguished from the question as to the logical importance of such a quantification, which is a question of logic)—such questions are usually discussed exclusively in the logics, and yet they are in fact psychological problems, and are to be settled, if at all, by the methods of psychology.

It would seem, then, to be in the interest of better logic and of better psychology to have more definite bounds set up between them. For many a psychological problem fails to get proper psychological treatment because, by reason of defective definition, it seems to be merely a logical problem; and many of the foundation-truths of logic, for a parallel reason, have appeared to lack validity because shown not to be psychological laws. Such errors would, of course, be impossible were the real basis of distinction between the two sciences once clearly seen and settled.

GEORGE M. STRATTON.

THE TESTIMONY OF HEART DISEASE TO THE SENSORY FACIES OF THE EMOTIONS.

What in ordinary parlance, as indeed in most psychological discussions, is termed emotion, is in reality a very complex activity. It is perhaps only in pathological states that the elements are analyzed by the falling out or suppression of certain elements. This analysis may be made in the case of fear. As a rule in the normal state, we have in fear a very vivid and attention-compelling concept of the fearful object, together with a more or less distinct representation of the fate of which we are apprehensive.

Perhaps in the majority of cases these elements usurp the prominent place in the complex, yet it is evident that neither of them is fear or emotion of any kind. We also usually have a more or less definite, if only implicate judgment of the reason for fear, but this is, of course,
no more fear than the judgment that if our body is unsupported it will fall.

A vivid reproduction or imagination of an event of a disastrous kind is quite sufficient, in my own case, to produce the physical and mental symptoms of fear. These symptoms are, in the one case, sundry muscular contractions of a spasmodic nature, which may have a more or less distant relation to the fearful event, or the still more distant associational connection seen in expression of emotion of displeasure, or the wholly unassociated innervation of excited attention. Most writers make too little of this class of effects of emotional impulse, i.e., of the state of general innervation in suspense, which has no association with any special purposive act, but which is a sort of preliminary tension (Spannung) preparatory to any possible impulse. In the other or mental domain these symptoms are obscure, that is unlocalized (but not therefore weak) sensations of innervations, but more particularly of vascular disturbance.

Entirely secondary, but often appearing more conspicuous, because localizable, are peripheral sensations. It may be shown that the real core of the fear is in the sensations of vascular change. It is perhaps idle to inquire whether the source of the disturbance is in the vascular change or whether it arises in the medulla, where its nervous center is situated. When an object of apprehension is imaged to consciousness it is certain that the vaso-motor center is affected and those circulatory changes characteristic of fear are produced. If this be not the case I may still view the serried ranks approaching and hear the horrid din of battle and may be fully conscious that any minute may stretch me on the ground mutilated beyond recognition, like a comrade at my feet, but I still have no fear as I calmly serve the gun. On the other hand, as I tread my way through the dense forest and suddenly find myself face to face with a little green snake which I have often handled with impunity—nay with pleasure, every drop of blood seems to stagnate in the heart, and I am a prey to unreasoning and unreasonable fear. It is, however, the pathological states of heart disease that are most conclusive. The irritable heart of neurasthenia affords proof of the connection of the sensation of fear with irregularities of the circulation. Thus, after a fatiguing day one falls asleep and rests quietly for several hours, then on awakening feels no pain or inconvenience of any kind, but soon finds his being suffused with what may be called a disassociated sense of fear or anxiety. One seeks for some reason for it in vain. In the earlier instances this disassociated fear soon affects its association with some concept of menacing content, such as
that of a previous hemorrhage or the like, or perhaps of some external event, and one is easily persuaded that it was this concept which had, unknown to him, produced the fear. Directly the heart begins to throb and palpitate and the paroxism runs its course, after which the fear disappears. After a time, one comes to recognize the meaning of the feeling of apprehension and, knowing its relative insignificance, calmly analyzes the state as he awaits its culmination. "There is nothing to fear—I shall be all right in ten minutes—there is no pain," etc., but all the while the fear is there. If one succeeds in preventing the erroneous association he escapes the secondary reflex effects of the frightful concept, but the fear remains and only passes away with the paroxism. Anyone who has had this experience can have no doubt of the sensational nature and vasomotor occasion of fears.

The reader may recall the experiments of Mosso which showed that even slight irritations of the skin or sense organs produce contractions of the peripheral vessels, while in painful emotion the vasomotor changes were excessive, and were accompanied by changes in the respiration and muscular tension. Laehr\(^1\) considers that the vascular center controls painful emotion as the cortex serves for the intellect. If the cerebrum has an excitation adapted to produce painful emotion, part of the reaction passes to the vascular center and part to the appropriate muscle centers. If the cerebral action is shunted out in any way, the reaction on the vascular center may be the more intense. He considers that the painful emotions have a transitory value only in the phylogeny and will disappear in the progress of a normal evolution.

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\(^1\)Die Angst., Berliner Klinik, 58.