something more than pressure + temperature? Does the 'fifthness' of the fifth remain the same though the elements be changed? It appears so. Stout says that 'togetherness' or, as he calls it, 'the apprehension of form,' is a distinct kind of consciousness, a 'constituent of consciousness comparable * * * with the perception of red or blue.'

The solution of this problem is to be found in an examination and criticism of our methods of psychological analysis and abstraction. If our method yields us an abstract particular, psychological atoms, then, to offset this, we are compelled to postulate some synthetic principle, some abstract identity. This is the fallacy underlying the uncritical use of such terms as 'mental activity,' 'attention,' and the various phrases by which this Austrian school of psychologists express the important idea of mental arrangement as over against the mental units which result from the analysis of any concrete experience.

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The Unity of Process in Consciousness. HENRY RUTGERS MARSHALL. Mind, New Series, Volume XI., pp. 470-502.

Looking at the world of living organisms, from the standpoint of an outside observer, one 'cannot but be impressed with the evidence that a unity of process exists through all the apparent diversity which he at first observes in the forms of living bodies.' Thus it appears, at least, to the biological investigator whom we may conceive to view this process as "a 'spirit,' if we may use the term, with such full capacity for scientific observation and analysis as man displays, but without any thought that his observations or analyses are aught else than interesting modifications of his consciousness; without any knowledge that his consciousness is related to any human body; and with no notion whatever that any form of consciousness has any connection with animal activities."

'Our spirit' observes that if any bit of matter, whether lifeless or alive, receives a stimulus, it reacts upon this stimulus and becomes a different thing. In the case of living matter, there is, apparently, the capacity to become again what it was before its reaction to the stimulus. But a closer inspection shows that this capacity is never exactly regained. Reaction to a stimulus never leaves the body exactly what it was before the reaction. In the case of the complex organism and environment this is called 'learning by experience.' Probably it is characteristic of all living matter, but escapes observation in the sim-

pler forms because of the inadequacy of our observation. That is, there 'must be a unity of process in all the reactions of living matter.'

Close observation, furthermore, fails to reveal any absolute distinction between the multicellular organism and the single cell. The cell is a complex, a system, a living machine, as truly as what we call the organism; and the activity of any part involves changes in the whole mass. "The activity of the system as a whole is in fact merely differentiated in form by this special activity of the part." Here, again, is evidence of a unity of process in the nature of life as exemplified in animal behavior, a unity which embraces the differences rather than excludes them.

As a test case, let us suppose that 'our spirit' turns his attention to the examination of the reactions of the nervous system of civilized man, which reveals animal behavior in, perhaps, its most complex form. Here, too, a close study shows 'that no reaction in any part of a system of systems can fail to modify in some measure the total pulse of activity in the whole system of systems.' "Stimulation and reaction occur in one and the same act." Stimulus, response, and the intermediate central nervous process are simply phases of an organic circuit. They are not successive stages but coördinate constituent functions in one process. The 'neurergic pattern' which the whole system or circuit presents depends simply upon what aspect is emphatic at the time.

'Our spirit,' however, may turn his attention to apparent variations from this. "He notes for instance in some cases immediacy of reaction to a stimulus, and in others a marked hesitancy." "Under certain conditions of stimulation he sees what appear as trial of one form of activity with failure, then of another with success, and a persistence of the successful form of activity." But here again 'he sees that the basis of the adaptation of the activity of a complex system of systems to new conditions must always lie in the emphasis of some partial activity in some minor system of the great system of systems; and that the capacity to effect this emphasis of a partial activity is one which inheres in all systems, whether relatively simple or complex, and that when effected it must give rise to a variation from the reaction which he has looked upon as typical.'

So far, this unity of process has been found and described by 'our spirit' in purely objective terms, such as the scientific biologist might use. "We may now assume that he suddenly, and for the first time, discovers the startling fact that his own mental states are in some way related to a human body." He first asks of what he is really thinking

when he says that his mind has a body. Take a concrete case. "I have a certain spatial presentative experience of an 'object in the outer world' which I call a sharp-pointed pin; and this is presented as approaching what is another 'object in the outer world' held in the same presentation, and which latter I call the finger of this human body. When in this complex presentation the pin touches this finger I experience not only the complex spatial presentation of the two objects in contact, but also what I may speak of as a streak upon the surface of the stream of consciousness, and which I call a painful pricking sensation; and this is a non-spatial presentation, it is not an 'object in the outer world.'" "I observe so many striking facts of this kind, and the evidences of the relation thus suggested are so many, that I am led to assume for the moment an hypothesis which I shall call 'parallelism.'" "If I think at all of the relation between the action of nerve in my body and my non-spatial presentation I cannot, under this hypothesis, assume the occurrence of a non-spatial modification of presentation without also assuming the existence of a coincident 'action of nerve' in my body." "I perceive at once that logically I should expect to be able to assert the reverse of this proposition, that is, I ought also to contend that I cannot assume any action of nerve in my body without assuming also a coincident modification of my non-spatial presentative experience."

There will be forced upon the attention of our introspective psychologist (for such 'our spirit' has now become), the fact of the unity of process in nerve action with which he has already become familiar as a scientific biologist. The continuity in the stream of consciousness is reflected in or is reflection of the unity of process in nerve action. And the neural systems within systems he finds reflected in the fact that consciousness in like manner is a complex system of psychic systems. Moreover, he finds that there is a 'noetic pattern' corresponding with the 'neurergic pattern,' and that he must view this 'noetic pattern,' also, "as a whole pulse of psychic activity, and these especially vivid presentations merely as partial psychic activities which for the moment are especially emphatic." "And thus he sees how what may really be a unity of psychic process, in a complex system of systems, may appear at the first glance to be a diversity of process."

But, is the converse true? Is all nerve action accompanied by a coincident psychic modification? Similar arguments lead to an affirmative answer. 'There is some modification of psychic life in connection with all action of nerve,' and this is 'mentality.' "There

must always be coincident a system of mentalities which under certain conditions becomes what we call a consciousness."

This, it seems to the reviewer, is the central problem. What are these 'conditions'? And why call these systems *mental* unless or until these conditions have been fulfilled? The real logic of Mr. Marshall's article seems to be this: In organic function we find and describe unity and continuity of life process, expressed in the idea of growth. The unity and continuity of function in the life process imply orderly and continuous activity with reference to an end. But the idea of end has meaning only in or with reference to conscious experience. Therefore, in consciousness alone is to be found real unity of process. Whether this is idealism or not is an entirely distinct question, depending upon one's conception of the nature of consciousness.¹

The assumption of unconscious mental states seems only confusing. We have already the convenient category of the neural or the physiological for the unconscious conditions of consciousness. Why then create a realm of the unconscious psychical to account for them? Why would it not be as legitimate to postulate a subphysical world to account for difficulties in physics as to posit a subpsychical realm to account for these unconscious conditions of consciousness?

Two further points: It seems to the reviewer that Mr. Marshall distinctly weakens his argument by his defense of the 'back-stroke' theory of the emotions. His own skilful analysis of the organic circuit seems rather to imply (what he denies) that 'the data for consciousness are in all cases supplied through afferent channels.' But very timely seems the criticism of Mr. Morgan's introduction of 'effective consciousness,' to account for the higher forms of animal behavior. "The principal objections to the view that consciousness at times 'enters in' to guide behavior, and at times does not, lies in its unacknowledged denial of the unity of process in consciousness."

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EXPERIMENTAL.

Eye-movements and the Aesthetics of Visual Form. G. M. STRATTON. Philosophische Studien, Bd. XX. (Wundt's Festschrift, II. Thiel), pp. 336-359.

The substitution of photographic records of eye-movements for introspective testimony as to the way in which the eyes behave is

¹ See a forthcoming article on 'The Functional Theory of Parallelism' by the present writer in the *Philosophical Review*, where this thought is developed.