

The chapters of most interest to the educator are those in which the physiological rhythms which characterize the nervous functions are dwelt upon at some length; then those which deal with fatigue and old age. The two final chapters are devoted to the study of education and to the statement of the 'wider view.' These deserve to be read in detail, and the reviewer will think his task sufficiently well performed if he has indicated on how wide a basis of positive data Dr. Donaldson's moderate but interesting practical conclusions are built up.

JAMES J. PUTNAM.

HARVARD MEDICAL SCHOOL.

*Mental Development in the Child and the Race: Methods and Processes.* JAMES MARK BALDWIN. New York, Macmillan & Co. 1895. (2d edition, 1895.) Pp. xvi+496.

Professor Baldwin's most recent book has already received much attention, and hardly needs introduction to the readers of this REVIEW. The volume is founded upon essays previously published; but in its wholeness it is an essentially new piece of work, which constitutes, so far, its author's most mature and original contribution to his science. It contains an uncommon union of decidedly special, empirical observations with comparatively recondite and very far-reaching evolutionary speculations. The present reviewer, as himself professionally disposed to the speculative, may very properly give his attention mainly to the latter aspect of the book, although well recognizing the high merits of the other aspect.

In its literary character this work, always as to all the details of the exposition pleasantly and stimulatingly written, is still in some of its most important features disappointingly obscure. Professor Baldwin's habit of referring to coming chapters for the explanation of the points that his present argument leaves unelucidated is too insistent, and has caused perplexity to more readers than one. Perhaps an author who deals especially with the phenomena of 'accommodation' may be doing well to enable the reader to make numerous subjective observations of the accommodation process while getting used to a novel and complex train of thought; but has not Professor Baldwin gone in this respect too far? To be sure he can be, and often is, so clear, especially as to the single sentence, illustration or argumentative point, that we are often most of all baffled in trying to make out why it is that just the connected whole, the unity, the total bearing of his reasoning, long escapes our close attention. Yet the result, when we get it, repays a good deal of trouble.

How does an organism come to make novel adjustments? How can new habits of a useful kind get formed? How can mind grow? What is the basis for the organization of experience, viewed as novel experience? In fine, how is 'accommodation' to be psychologically and biologically explained, in the individual and in the race? Here is the central problem about which Professor Baldwin's evolutionary speculations are grouped. Of old the organization of experience, as studied by the psychologists who followed in Locke's footsteps, and who developed the association psychology, meant primarily the grouping of the impressions and ideas, or of the Herbartian *Vorstellungen*, viewed as data received, retained and associated. That the experience of the mind influences conduct was regarded as a matter of relatively secondary import in the study of mental growth. But nowadays the psychologist is dissatisfied with confining his attention to these mental data, in so far as they merely come *to* the mind. One observes that the experience of a live creature is useful to the possessor *only* in so far as this experience influences the movements, organizes the conduct, calls forth or adapts the adjustments of the creature itself; and since Spencer's Psychology the problem of the organization of mental experience has been inseparable from the evolutionary problem regarding the acquisition of serviceable motor habits upon the basis of sensory stimulations. Every evolutionary psychologist attempts more or less elaborately and explicitly to trace the beginnings and the growth of mentally significant adaptations, and to correlate what we know of mental processes with such adaptations. In this field the well-known hypotheses relate, on the one hand, to the influence of natural selection upon the evolution of mentally significant capacities for motor adjustment, and, on the other hand, to the variously interpreted relations of pleasurable and painful stimulation to the modification of motor processes.

Professor Baldwin's contribution to this discussion may be briefly indicated, but cannot be quite fairly developed within the present limits. After devoting considerable attention (p. 180 sqq.) to an argument showing that the experience of the pleasurable or painful *results* of movements once made cannot be relied upon as a factor sufficient to explain the way whereby an organism not already provided with useful motor adjustments may acquire such adjustments, Professor Baldwin proceeds henceforth, in his speculations, upon the postulate that, in order to explain the origin of specific accommodations, *i. e.*, of definitely useful motor adjustments, "a theory of adaptation must have reference to the repetition of stimulations, funda-

mentally, not of movements" (p. 451). One must suppose, namely, that, in advance of all definite habits of motor adjustment, and in the absence of inherited tendencies to definite acts, a virgin organism (if we may use the phrase)—one standing at the outset of the evolutionary process—possesses just one, highly generalized, but essentially plastic motor tendency, whose origin (p. 203 *et passim*) one must refer to natural selection. This is the twofold tendency to expand in the presence of stimulations which exalt, and to contract in the presence of those stimuli which depress vitality. That such simple reactions to the presence of light, of food and of injurious objects exist and are universal amongst organisms of even the lowliest type is well known. The present theory supposes that the stimulations which cause expansion are pleasurable, and that those which cause contraction are painful. But now the expansion tendency is the representative of a vital 'excess,' an overflow of energy. From its nature it tends to lead the organism in question nearer to the source of the advantageous stimulation, and hereby it tends to produce a '*repetition*' of this stimulation, which again results in further excess, and in more movements of the same sort. This tendency to move so as to secure a repetition of the favorable stimulus involves, however, at every step, by reason of the very excess which is essential to the process, relatively novel movements. If these new movements, in so far as painful accidents do not check their appearance, tend to get fixed, as they do, in the form of habits, the organism, wherever it is exposed, thereafter, to new stimuli, will now be no longer virgin. For, in addition to its original and generalized tendency to expansion and contraction, it will henceforth have definite tendencies to certain movements. The nature of these movements, in view of their origin, and in view of the fact that all pain-giving or even useless accidental accompaniments of the excess process have tended to be excised by the original tendencies to draw back from the painful, and to emphasize the pleasurable stimuli, will be such that the newly acquired movements will be *apt to repeat stimuli of a certain type*. Henceforth the now trained organism will more and more tend to this type of 'circular reaction,' moving in the presence of certain types of stimuli so as to repeat or to enforce them; moving in the presence of other stimuli (*viz.* painful stimuli) so as to avoid repeating them. Upon this 'circular' type of reaction, as Professor Baldwin ingeniously insists, the remainder of the process of mental evolution is founded. This is the type to which, as readers of Professor Baldwin's remarkable paper in *Mind* and readers of this REVIEW well know, our

author applies the general name imitation. Every new type of imitative or circular reaction once thus acquired becomes a basis for further modification or adaptation through the influence of new stimulations, whose effectiveness, in all pleasurable cases, will be ensured through the very existence of the repetition tendency itself. On high levels the circular reaction appears as the act of attention, whereby the effect of a given stimulation is, through repetition, so heightened as to ensure its effectiveness in causing accommodations. "In general" (p. 179) "the law of excess may be stated," says Professor Baldwin, "somewhat as follows: The accommodation of an organism to a new situation is secured, apart from happy accidents, by the continued or repeated action of that stimulation, and this repetition is secured, not by the selection beforehand of this stimulation, nor by its fortuitous occurrence alone, but by the proximate reinstatement of it by a discharge of the energies of the organism, concentrated as far as may be for the excessive stimulation of the organs most nearly fitted by former habit to get this stimulation again." Granted the repetition, and the accompanying excess, then the organism gets adapted 'by chance adjustments occurring among excessive diffused movements' (p. 198); since the process of repetition tends to favor these movements, so that ere long they become habits.

A crucial case for this theory of the acquisition of new fashions of movement is furnished by the phenomena which (p. 373) first attracted our author's personal attention to the considerations that now have taken form in his theory. These are the phenomena of the rise of volition in the child. Volition, our author insists, is a phenomenon, at the outset, of 'persistent imitation,' of the 'try-try-again' tendency of the child. In so far as an organism inherits tendencies which early, under the influence of pleasure-pain experiences, get welded, without deliberation, into even complex movements, such as are involved in holding the head erect (p. 390), Professor Baldwin does not consider these cases of volition. The acts that thus early get established may, by reason of the generally imitative character which all the organic responses to the environment must possess, appear, in children, as simple imitations. But these simple imitations, acts which, without deliberation, tend to reproduce given stimuli, are not yet voluntary. On the other hand, in the case of the 'persistent imitations,' the child has a model before it, and is first stimulated by this model to an act of more or less inaccurate involuntary imitation. Hereupon, however, the child is dissatisfied with the presented contrast that now appears between its model and this imperfect imitation.

The dissatisfaction gets expressed in an intensely attentive tendency to watch the objective model, and to repeat with variations the imitative act. The resulting process of trial and error may be a very extended one, the attention to this process may be long repeated, until at last the imitation comes to resemble the model enough to satisfy the child. This process constitutes, in Professor Baldwin's account, the first appearance of true volition, since here is an ideal, long attentively held before consciousness, and the gradual and persistent adjustment of means to ends.

These being, according to our author, the observed facts, it remains still to indicate the theory of the process of persistent imitation. Why this strained attention, this long pursuit of the ideal, and why—here is, of course, the more difficult question—why and how does this process of persistent variation of the first response to the model gradually tend to the establishment of acts which actually repeat the model more closely than the first act did?

Professor Baldwin's theory as to this matter is best stated on page 453: "In persistent imitation the first reaction is not repeated. Hence we must suppose the development of a function of coördination by which the two regions excited by *the original suggestion and the reaction first made coalesce in a common more voluminous and intense stimulation of the motor centre*. A movement is thus produced which, by reason of its greater mass and diffusion, includes more of the elements of the movement seen and copied. This is again reported by eye or ear, giving a new excitement, which is again coördinated with the original stimulation, and with the after-effects of the earlier imitations. The result is yet another motor stimulation or effort of still greater mass and diffusion, which includes yet more elements of the 'copy.' And so on, *until simply by its increased mass, including the motor excitement of attention itself*, by the greater range and variety of the motor elements thus enervated, in short, by the *excess discharge* the 'copy' is completely reproduced. This, it is evident, is just the principle of 'excess,' and it is very easy to find in it the origin of the attention. The attention is the mental function corresponding to the habitual motor coördination of the processes of heightened or 'excess' discharge."

In this conception, it will be noted, the general theory of excess, as stated above, is applied to the special case of volition, by the hypothesis that the being who possesses the power to acquire voluntary skill differs from beings lower in the scale by the presence, in his case, of centers of coördination where the continuation of the stimulus that

produced the primary or simple imitation meets, later, with the resulting stimulus due to the perception of the imperfect copy. The result of this meeting is a new and more intense motor stimulation, involving at once attention and diffused new motor processes. That some of these new motor processes result in agreement with 'more elements' of the model is due simply to the fact that they *are* more numerous and diffuse than were the motor processes of the first imitation. And volition is now present, just because volition involves an element of persistent anticipation of a complex act that, when it comes, is to realize an ideal.

The natural question arises here, as in Professor Baldwin's other discussions of the results of the excess process, why it is that, when the successful imitation at last results from this process of excessive stimulation, the unnecessary or unfitting portions of the motor excess fall away. While the child is learning, in this persistent imitation, the essence of the process, according to the theory, is that the stimulation of the 'coördination-center,' through the combined sensory effects of the model and of the resulting imperfect efforts to imitate it, leads to excessively diffuse movements, *some* of which, by virtue of the mere diffusion, tend to produce results agreeing with the model. But since many of these diffuse movements of excess (such as kicking, tongue-movements, and the like incidents of the strain of learning) do *not* tend to make successful copies of the model, why do they later disappear and leave the successful imitative deed to become a settled habitual acquisition?

Professor Baldwin's response to this question is (p. 445, *cf.* p. 377) that "When muscular effort thus succeeds, by the simple fact of increased mass and diffusion of reaction, the useless elements fall away because they have no emphasis." Or, as p. 377 states the case, 'the useless elements fall away because they are useless.' It seems plain that considerations equally undeveloped govern our author wherever he speaks of that elimination of the useless or unadaptive elements of the excess-discharge which all grades of the process of accommodation, from the lowest up, appear to involve. Surely the very nature of the excess-discharge, in advance of definite adaptation, must be that it generally involves useless reactions quite as probably as useful reactions. The only apparent exception to this would be furnished by the primitive expansion movements noticed above. They, it may be said, inevitably involve a tendency to reinforce their stimulation, and to continue its presence, because the expanded organism will, as such, offer more surface to the source of stimulation. But as soon as one passes

from this primitive state to the case of an organism having activities already complex, adaptation through the chance results of excess will apparently occur only in connection with the initiation of many undaptive movements, which will need to be eliminated whenever the accommodation can become perfect. If one writhes or kicks in learning to draw, a positive theory is needed to account for the rapidity with which these unnecessary movements fall away after the occurrence of the successful imitation; or, even before that occurrence, since one must take theoretical account of the further fact that *such* excess-movements generally oppose the attainment of an accurate imitation, and must, therefore, in part, be eliminated *before* the first accurate imitation can occur.

Of course the elimination of painful and of positively unsatisfactory movement is used by Professor Baldwin as a coördinate factor in this process of the reduction of the excess to its due form (see p. 143). But this does not of itself explain the inhibition of such useless elements of the excess as are not directly felt to be in themselves unsatisfactory. Yet such elements might be not only present, but actually injurious to the imitation. An awkward man tries to acquire a new imitative art. He reacts to his model, and then observes the inadequacy of his first imitation. The perception of the incongruity excites his coördinating centers. The result is a new set of efforts, which may involve numerous excess-movements. Of these some will of themselves tend 'to include more elements' of the model. But some of them, perhaps most of them, will not only be superfluous, but will also actually stand in the way of the accomplishment of the desired aim. For, if the model is at once complex and definite, inhibition of the unnecessary will be an essential part, and, in most cases, a preliminary, of the first success. The immediate result will so far be that increased effort, in advance of inhibition, will mean failure. The 'more elements' of the right sort will be so mixed with 'more elements' which lead astray, that the total results will perhaps be no gain in accuracy. Now, if the awkward man can himself analyze his act and discover that the inhibition of certain superfluous elements would ensure success, *then*, but only then, will these superfluous acts become, by association, disagreeable to him, as hindering his ideal, and meaning failure. Thereupon the elimination of these elements will become easy to him. But surely a learner who can analyze the source of his own failure has already come to stand high, through previous success, in the imitative art. On the other hand, the really awkward man may easily be sensitive enough to be dissatisfied with his failure, and

yet may be unable to analyze the cause of his failure. He makes, in one act of persistent imitation, superfluous efforts and useful efforts. Who is to tell him which of his efforts are the superfluous ones? What influence is, in advance of success, to overcome, to inhibit, the hindering elements of the excess-process? Their own disagreeableness as hindering elements. But it is for him, unless he is already skillful enough to analyze, only the total result whose failure is disagreeable. The superfluous parts, by themselves, cannot appear to him, separately, disagreeable enough to get inhibited, unless some preëstablished harmony makes them so. The awkward man will try and try again, with excess and failure constantly attendant upon his efforts. The more he strains, the more superfluous efforts will he make, until the whole process ceases in painful exhaustion. Here there will be no necessary tendency of excess to secure ultimate success.

. Now this is no merely imaginary case. This is the process of failure in many instances of industrious awkwardness. This is what happens when we think vainly over our problems, and yet get no result. This is what happens to the socially awkward, who attempt social enterprises only to get more and more lost in the chaos of their own excessive efforts. This in particular is what happens in our personal relations to the people with whom, despite our best efforts, we 'cannot get on.' In trying to conform to their ways we attempt useless acts of conciliation, make ineffective chance remarks, complicate our relations through unnecessary explanations, and yet can never quite find out what it is that makes us go wrong. The excess reactions then, as such, need not involve useful *plus* merely superfluous reactions that will not positively hinder success. The excess reactions may, and often do, involve a union, that is for the striving learner unanalyzable, of useful and of positively hindering acts. The question here is what magic in advance of success is to ensure the inhibition of the elements of hindrance thus involved in the excess discharged?

But does one reply, with Professor Baldwin, that actual observation of the child's imitative successes shows, first the excess reactions, and then the inhibition of the superfluous elements? Hereupon one can but retort that the very problem of the acquisition of new habits is: How do these inhibitions of the superfluous elements take place? Does one say: Success is sometimes possible? The obvious retort is, What particular factor leads to success when the latter does occur? To this problem, so far as the present reviewer can see, Professor Baldwin has given very scant attention. Yet, unless this problem is

definitely faced and solved, an appeal to the facts of excess, interesting as it is, must prove wholly inadequate to show how definite new habits can get formed. For, as a fact, whoever learns a new habit, either by persistent imitation, or by some less intelligent process, learns more numerous inhibitions than he does positive adjustments. This appears to be true low down in the animal scale as well as higher up, and the difficulty developed in the foregoing is one of a very general application. If excess is the beginning of novel adjustment, selection amongst the elements of the excessive reactions to interesting stimuli involves much more than the merely superior emphasis given to certain of these reactions by their pleasure-giving character, or even by their success as imitative reactions. Nor is the principle that the painful elements of the excess get eliminated by reason of their painfulness a sufficient account of how the needed inhibitions occur. For there remain to be accounted for the vast number of superfluous reactions which are not directly painful, but which are *indirectly* opposed to the definiteness and success of the new habit. The animal acquiring a novel skill in watching for prey must learn to suppress numerous signs of excitement which will indirectly hinder the success of its quest. How shall the principle of excess and selection work here? The excitement-phenomena will belong to the excess-wave. Whence will come the selection? From the animal's own intelligent observation of the hindrances that result from these superfluous acts? But it is the *origin* of just such intelligence that we are here tracing. No intelligence of this grade can exist unless definite successes have already given the animal a criterion for judging its own failures. The imitative animal must learn, and does learn, to be silent and hide when the others do so, to stand still and watch when the others do so, and in countless other ways to imitate inhibitory deeds and attitudes. But in the case of the imitation of inhibitions, how is the excess, merely as such, to contain 'more and more' elements that gradually conform to a model whose very essence is that its outward appearance involves a suppression of elements, the negative fact of the absence of certain groups of deeds. On the other hand, to explain all these inhibitions as due to the experience of the painful results of the acts suppressed is simply to abandon the region where a theory of imitation ought to have most scope, viz: the region of the imitation of inhibitions, or of acts in so far as they involve inhibitions. For, as pointed out, every complex positive act involves more inhibitions than it does positive activities.

Now, it is indeed true that Professor Baldwin has given some at-

tention to the conditions of inhibition and of selective self control. But so far as the present reviewer is able to understand the very summary observations upon p. 473, our author appears to regard the problem of inhibition as altogether a secondary one. On p. 456 we do indeed find stated, as in several other passages, the 'problem of selection,' with some indication that the excess-function needs a selective accompaniment over and above the ones upon which our author lays most stress. And, as Professor Baldwin here adds: "In attention we have, undoubtedly, the one selective function of consciousness." One expects to find, accordingly, in the subsequent discussion of attention a genetic explanation of the obviously inhibitory character which forms so large an aspect of every attentive process. But what one finds is a valuable development of the doctrine of the positive motor elements of attention. At the end comes the passage of p. 473: "The theory of motor development now worked out throws much light also on the whole vexed question of muscular control—the regulation of movement in amount and direction, and its suppression, etc." There follow two or three sentences regarding the positive aspect of control, and then the words: "And negative control or inhibition represents, in general, the limitations which old organic ways of action impose upon our ways; the new must conform, if possible, to old organic 'copy.'" Surely, this means, if anything, that the presence of inhibition, at least where the latter is not a direct case of the results of painful stimulation, is due to the influence of old imitative functions already set in the organism. The present reviewer's difficulty is, however, that some sort of inhibitory process, not wholly due to directly painful stimulation, must be posited in order that the first important selections from any excess reactions should take place; that Professor Baldwin's discussion everywhere silently presupposes the presence of just such an inhibitory aspect of the whole selective process; that the dropping of the superfluous reactions, merely because they are not emphasized by success, is wholly insufficient to explain the actual selection upon which all new adaptation depends; that, as every teacher knows, some dropping of the superfluous is, in general, a necessary *preliminary* to success in novel adaptations; and that, therefore, in the absence of any teacher to do the inhibiting, the organism itself must contain the conditions for such inhibition of the superfluous; and that, in fine, without such primary inhibition, no theory of excess reactions can possibly explain the acquisition of definite new habits.

To conclude, then, the theory of the origin of imitation will be, in

the present reviewer's opinion, whenever it comes, a theory of the origin of inhibition quite as much as a theory of excess functions. The presence and importance of the latter, the excess functions, Professor Baldwin has, indeed done well to recognize; but the theory as he leaves it is essentially incomplete, for the lack of any genuine explanation of the selective process everywhere presupposed by the whole discussion. Despite this essential gap in this theory, the volume before us is so full of ingenious observation and of courageous speculation, as to leave no enlightened reader in doubt of its author's power both to see and to think, and doubtless, ere long, to lead us further into the world where he has already done such admirable work. Agreeing fully, as the present writer does, with the prominence given in this book to the value of imitation for the whole of the higher mental processes, rejoiced as Prof. Baldwin's reviewer is to find in many pages doctrines as to the psychology both of imitation itself, and of the intelligence generally which he would have been glad, indeed, to have been able to express himself, one can only regret, in closing, that the foregoing comments have often been as negative as they have been. But it is by temporary disagreement that our common interests often find themselves in the end best furthered.

HARVARD UNIVERSITY.

JOSIAH ROYCE.

*Studies in the Evolutionary Psychology of Feeling.* HIRAM M. STANLEY. London, Sonnenschein; New York, Macmillan. 1895. Pp. VIII+392. \$2.25 net.

Mr. Stanley's book is, in my opinion, an interesting and important contribution to genetic psychology. It takes up the Spencerian formulation of the problem of mental development—the interpretation of the functions of the individual consciousness in the light of race-utility—and attempts to throw light on this question by the introspective method. As far as such a problem can be approached by such a method, Mr. Stanley approaches it; but he cannot, I think, discover in the adult mind a science of mental embryology. With this essential limitation of method—a limitation which is not accidental, but which Mr. Stanley defends—his results are rich in suggestiveness, and mark the author as entitled to a high place among contemporary authors in developmental psychology. This the more because his results are peculiarly his own, as his method necessarily makes them. With this general appreciation of the book, which I do not intend the criticisms which follow in any way to impair, I may set out a few