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THE
Psychological Bulletin

111
J. MARK BALDWIN
JOHNS HOPKINS UNIVERSITY

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THE
PSYCHOLOGICAL BULLETIN

PSYCHOLOGICAL PROGRESS IN 1906.

BY PROFESSOR EDWARD FRANKLIN BUCHNER,

University of Alabama.

If a science exists in the making, our most recent year presents psychology as 'transitional.' If, on the other hand, the net results of endeavors constitute a science, then psychology may be equally regarded as 'substantive.' One is free to his own choice, for the year has been a quiet one. Free from the bustling activity of its immediate predecessors, it may in the long run prove as valuable as they. In any event the psychologist must live through the quiescent seasons as well as those of strenuous interest. He has probably produced his books, he has filled his technical journals with unfailing regularity, and he has contended in the forum of his associations. We should expect some effects of a rhythmical character to appear here in the wider aspects of a chronological unit, as well as in the activities of an individual organism. There are 'ups' and 'downs,' 'ins' and 'outs' in the psychological years. This appeared in the account, prepared some time since, of psychological progress within a restricted field.¹ And 1906 appears as a period in which the psychologist has possibly been resting after a season of tension; or, better still, let us hope, taking breath for a later increased activity.

Two features of the year may be said to stand out plainly, even if they do not eventually prove to become historically characteristic. In view of the recent efforts of the great dictionary makers, both technical and general, it is a bit surprising to find a rising tide of dissatisfaction threatening to engulf some of the 'older' (and almost consecrated) terms in psychology. The recent dispositions made of 'consciousness' are closely followed by a confessed willingness to see such terms as

¹ 'Ten Years of American Psychology,' in *Science*, N. S., Vol. XVIII, pp. 192 ff., 233 ff.

'feeling,' 'sensation,' 'perception,' and others disappear entirely from the language of the student of human experience.¹ Oddly enough, too, new terms are not at hand nor suggested to replace those now worn thread-bare by long usage. Might they have fallen into contempt by reason of too great familiarity? This tendency may be presaging the advent of the framer of the vocabulary of psychology for the new twentieth century!

Being synchronous with another tendency accentuated during the year, it probably should receive its interpretation in the light of the latter. The second feature is not a property peculiar to the year, but is the fruition of a tendency or partial point of view which has been accredited to the science for some time. The genetic method has been wielding an influence shaking up the old distinctions; but not until the period under review has there been such a transversing of the whole psychological field solely by its intellectual right and its scientific authority as that made by Baldwin's *Thought and Things*.² This is more than a tendency: it promises a complete reconstruction of psychology and also of the cognate philosophical disciplines of logic and epistemology, leaving the time-honored distinctions far behind. The immediate program of this volume and its companions soon to follow is, to be sure, restricted to the range of cognitive experience, but to the entire range of such experience. The success of this effort 'to put a consciously genetic method through the entire structure of cognition from the simplest to the most developed mode,' can of course but lead to a similar treatment of the remaining fields of psychological interests. The apperceptive use of 'logic' (cf. pp. 15, 33) will probably lessen the credit of psychology arising from this undertaking, if it does not lead to definite misunderstanding of such an application of the method of genesis. The achievement can be interpreted as an age-movement, and be closely related to the current intellectual *need* which has been finding widespread satisfaction in pragmatism. The item of historic interest is that the initiative has come from within psychology, and the results stand closer to the assured gains of the science than do the deviations towards the quasi-metaphysics of the times. Such a work as this may well check much of the current fruitless analysis of

¹ See, e. g., the discussion at the Cambridge (Mass.) meeting, 1905.

² *Thought and Things. A Study of the Development and Meaning of Thought, or Genetic Logic*. Vol. I.: *Functional Logic, or Genetic Theory of Knowledge*. London, 1906. The more complete engrafting of the genetic method in current thinking is well indicated by the demand for new editions of the same author's two volumes on *Mental Development* which have just appeared.

prepositions and conjunctions which are supposed somehow to be the points of intellectual approach in our 'fluid' experience. This 'between-things' philosophy has rapidly become ultra-psychological in its extreme individualism, not to say non-social. The genetic orchestra, to speak in terms of Lotze's well-known critical despatch of all theories of knowledge, being tuned up will at last give us a number, and permit us to enjoy the music of thought.

The attitude of the psychologist towards his subject-matter seems to be less a question for debate or a theory for elaboration than formerly. In spite of the fact that the functional point of view seems to have almost completely won out, there continue efforts to be even more precise in the application of criteria to consciousness. Ostwald, for example, in his Cambridge address on 'Psychical Energy' presents a restatement of his doctrine of energism in psychology. The value of a chemical philosophy for psychology is made to appear in the application of energy, our 'best and largest concept,' to the equation which consciousness seems to require. Every mental process takes up and consumes chemical and physical energy which otherwise disappears in a man's make-up. 'As this theory is the only one which opens a way to connect the inner and the outer world by a functional relation, it has a distinct advantage over the theory of psycho-physical parallelism, which is no theory at all, but only an arbitrary declaration that no such functional relation exists.' Another effort which remains more pertinently within the field of psychology and thus is the more to be commended, is an analysis of the fundamental functions of consciousness made by Warren.¹ In order to avoid the partiality inevitable in the over-emphasis placed upon 'special adaptations to the environment in which conscious beings chance to be placed,' he looks upon sensibility, modification, differentiation, association and discrimination as basal functions 'to whose operation every phenomenon of consciousness can be traced.' A possible feature of such an analysis is a more vital reunion of the analytic and genetic standpoints. There can indeed be only one result from this general 'methodological' clearing of the field which has attracted so much attention of late, and that will be to give psychology greater integrity as an independent science.

The physical conditions of conscious activity have been allowed to rest without much scientific disturbance. Flechsig continues his physiological interest in psychology, albeit in his one-sided way.² He

¹ 'The Fundamental Functions of Consciousness,' *PSYCHOLOGICAL BULLETIN*, July 15, 1906.

² 'Hirnphysiologie und Willenstheorien,' in *Annalen der Naturphilosophie*, 1905, Heft 4.

reaches the position that the volitional processes have their exact localization in the cortex and, more explicitly, in the motor areas. A certain heterodoxical innovation has been suggested by Stern in his mechanics of motor control.¹ All neural impulses being centripetal, and the central motor ganglia having certain powers of resistance against peripheral energies, it is suggested that muscular relaxation occurs when the cortical resistance is 'high' and contraction takes place when the resistance is 'low.' Dearborn has denied 'the hereditary *ex cathedra* supposition that the brain is the sole correlate of the mind,' and presented 'the claims of muscular protoplasm for consideration as representing a part of the mental process.'² This is a detailed reading-back into anatomical terms what psychology has contended for for some time respecting the organizing effects in experience of the motor processes. Auerbach thinks he has localized 'musical talent' in the cerebral region by specifying the supra-marginal and -temporal gyri.³ An attempt to settle certain questions of race psychology through the physiological mode of approach is made by Bean.⁴ "The white and the black races are antipodal in cardinal points. . . . The Caucasian and the negro are fundamentally opposite extremes in evolution." Head, Rivers and Sherren have utilized an interesting and profitable mode of analysis of sensory elements, with special attention to skin and pressure sensations not normally recognized.⁵ By a careful study of peripheral nerves under conditions of injury and division, they seem to find several systems of sensory mechanism in the return of normal sensibility after the slow subsidence of the traumatic effects. These results might lend themselves to genetic analysis as well.

It need not be regarded as historically unusual if vision continues, as it does, to occupy the center of interest in our laboratories. It is visual movements rather than other forms of optical conditions of experience which seem to be concentrating the efforts of our experimenters. The outgrowth of much of this current activity may appear in a very manageable form in the new manual on 'The Psychology of Stereoscopic Vision' announced by Jastrow. A very simple device by McDougall offers something that may improve the investigation of fatigue and recuperation.⁶ Among its virtues is the double claim that

¹ *Die pseudomotorische Funktion der Hirnrinde*, 1905.

² 'The Relation of Muscular Activity to the Mental Process.' See PSYCHOLOGICAL BULLETIN, 1906, p. 41.

³ *Archiv für Anat. u. Phys.* (Anat. Abth.), 1906, pp. 197 ff.

⁴ 'The Negro Brain,' *Century Magazine*, Sept., 1906.

⁵ 'The Afferent Nervous System from a New Aspect,' and 'The Consequences of Injury to the Peripheral Nerves in Man,' *Brain*, 1905, pp. 99-338.

⁶ 'On a New Method for the Study of Concurrent Mental Operations and of Mental Fatigue,' *British Jour. of Psych.*, 1905, pp. 435 ff.

it secures a 'graphic record of any failure of continuity of voluntary attention, and an objective measure of the accuracy' with which any given test has been performed. How patiently experimental methods must proceed, and how meagre their results, in an analysis of the conditions of 'learning,' may be seen, for example, in Brown's study of the processes of addition, subtraction, multiplication and division.¹ One of our great desiderata is an efficient psychology of learning; and laboratory coöperation, if not inter-laboratory organization, could with profit take a turn at tracing out this unique response to cognitive situations in mental development.

One current interest in feeling has already been indicated. The theory of emotion has commanded a certain amount of attention, and, oddly enough, with respect to the validity of the James-Lange theory. D'Allonnes has reported a case of visceral anæsthesia where the emotions were absent but the external expression of them was present.² The case suggests to the author a modification of the James-Lange view so as to regard 'internal sensations alone affective and essential to emotional life.' Sollier has in recent years shifted from an earlier acceptance of the peripheral theory of the emotions, and now advances a central theory, which is mechanical and physical in character. Emotion is 'the diffusion of energy, transformed and liberated by the brain in the brain itself, and the absorption of this energy by the brain' at the expense of the effective work for which it was destined.' His material is derived chiefly from his study of hysteria. Lagerborg, on the other hand, closely follows the James-Lange theory, in fact descending a little lower in the physiological scale, if one might so speak, and regards emotions as 'repercussions due chiefly to nutritive reactions.'⁴

The field of psychological æsthetics has been credited with two rather widely divergent contributions, which show indeed the extensive applications of the psychological spirit and its varied methods. In the 'Fechner Number' of the PSYCHOLOGICAL REVIEW,⁵ Miss Martin shows a sustained application of experimental inquiry to the notable æsthetical principles laid down by Fechner in his *Vorschule*. In the recent addition of the first part of the second volume to his *Völkerpsychologie*, Wundt well indicates how the fields of anthropology and

¹ 'The Psychology of the Simple Arithmetical Processes,' *Amer. Jour. of Psych.*, 1906, pp. 1 ff.

² 'Rôle des sensations internes dans les émotions et dans la perception de la durée,' *Revue Phil.*, 1905, pp. 592 ff.

³ *Le mécanisme des émotions*, 1905.

⁴ *Das Gefühlsproblem*, 1905.

⁵ Vol XIII., No. 3, May, 1906.

sociology may be reconstructed in the hands of a master in psychology. In accounting for the organization of the mythical and religious creations (chiefly the former) in the racial beginnings, two positions are made dominant. Primitive tendencies of these types are viewed as on a level with the processes of perception in individual psychology, and are explained by means of imagination. Myth-making is identical with the process of sense-perception. 'Primitive man,' so long an unknown or an abstract quantum or qualis to science, is therefore not left a somewhat which has become archaic, and thus archeological. To the skeleton of this bold theory, flesh and blood are given by his adoption of *Einfühlung*—the current æsthetic theory. His application of the 'feeling-in' or sympathetic process is doubtless a definite extension of this æsthetic principle.

Individual psychology, which has been attracting more and more attention and greatly improving in the value of his judgments in consequence of the more careful sifting of data and the more adaptable refinements of statistical methods, has within the year received a marked contribution. The appearance of the *Biographical Directory of American Men of Science* early in the year has been closely followed by a careful interpretation of its data by its editor.¹ Cattell has been more fortunate in the selection of his data than either Ellis,² or Woods,³ and the results of his treatment of them therefore occupy a higher level both as to probability and pertinency. Out of the four thousand scientists in America listed in the *Directory*, psychology claims one hundred and ninety-two, or only 4.85 per cent. Of the one thousand whose meritorious performances are studied, fifty are assigned to psychology, being 5.00 per cent. This gain might suggest the greater worth of performance when it is in the field of our science. Of the twelve scientific groups, psychologists are the most segregated, only two having been assigned 'positions' in other sciences. This is not to be regretted if it may be taken as a sign of astute devotion of the American psychologist to his *Fach*. As a measure of ability, these studies are by far the most interesting we have, and future psychology will eagerly await the projected comparison with scientific performance among other nations.

Genetic and social psychology seem to be setting up a new house

¹ 'Statistical Study of American Men of Science: I., The Selection of a Group of One Thousand Scientific Men,' *Science*, Nov. 23, 1906, pp. 658 ff.; 'II., The Measurement of Scientific Merit,' *Ibid.*, Nov. 30, pp. 699 ff.; 'III., The Distribution of American Men of Science,' *Ibid.* Dec. 7, pp. 732 ff.

² *A Study of British Genius*, 1904.

³ *Mental and Moral Heredity in Royalty*, 1906.

together. And, if one mistake not the signs of current discussions, the progeny will stand forth accredited to a new moral psychology, or the mental evolution of the moral attitude. There is already a large amount of raw material scattered in these provinces and in the adjacent region of religious psychology.¹

Comparative psychology has been greatly enriched by Jennings's final statement of the work he has been doing on the lower structures.² Its worth does not reside in the light it may throw upon the question of the ubiquitousness of consciousness in these minuter structures, but rather in the consistent check it will probably give to the further pursuit of the theory of invariable reflexes or tropisms. The attitude of Jennings is fruitfully different from that maintained by Pavlov in his recent Huxley Lecture,³ his contention being that physiology has been advancing by borrowed light, the explanatory ideas of psychology, — a source 'of evil influences.' One reason for anticipating in the early future better psychological knowledge of animal behavior may be found in Claperède's answer to the sceptical biologists.⁴ Another may be found in the rapidly increasing number of students in this field.

As in former years, one may turn to to the *Psychological Index* for a quantitative estimate of directions taken in developing different psychological interests. The following table is based upon the *Indexes* for 1904 and 1905.

1904.		1905.	
No. of Titles.	Rubric.	No. of Titles.	Rubric.
751	Sleep, trance and pathology.	482	Higher manifestations of mind.
541	Genetic, individual and social psychology.	477	Sleep, trance and pathology.
539	Sensation.	473	Genetic, individual and social psychology.
478	Higher manifestations of mind.	428	Sensation.
362	Anatomy and physiology of the nervous system.	270	Anatomy and physiology of the nervous system.
269	General.	228	General.
206	Conation and movement.	135	Conation and movement.
165	Cognition.	128	Cognition.
93	Characters of consciousness.	67	Characters of consciousness.
41	Affection.	39	Affection.
3,445		2,727	

¹ Cf., e. g., Tufts, 'On Moral Evolution,' in the Garman *Festschrift*, *Studies in Philosophy and Psychology*, 1906, Westermarck, *The Origin and Development of the Moral Ideas*, 1906, and Davenport, *Primitive Traits in Religious Revivals*, 1905.

² *Behavior of the Lower Organisms*, 1906.

³ 'The Scientific Investigation of the Psychical Faculties or Processes in the Higher Animals,' at the Charing Cross Hospital. See *Science*, Nov. 16, 1906, pp. 613 ff.

⁴ 'La psychologie comparée est-elle légitime?' *Arch. de Psychol.*, 1905.

The literary output of the year 1905 shows a loss of twenty per cent. from that of the preceding year. The last six rubrics retain the same rank. The first three of the 1904 order each drop one position in 1905. Aside from this shift, there is only one real change in the relative values indicated by the table: 'higher manifestations of mind,' (facetiously almost!) passes from the fourth to the first position. As pointed out above, this year has been quieter and more steady than last year. Our table carries this trait back a year earlier. But even this gross quantitative measure, which equates books, monographs and articles, good, bad, and indifferent, is suggestive as showing that psychology is maintaining either a proportionate, or a dead level of interest.

Another quantitative estimate, limited to America, is found in the report of 'Doctorates Conferred by American Universities.'¹ During the period of the last nine years psychology as a productive university study is in a class with physics and zoölogy; 124 doctorates have been conferred in psychology, 128 in zoölogy, and 133 in physics. Chemistry, with 282, heads the list and constitutes a class by itself. If certain economic values explain the position of chemistry, others may at least in part be applicable to the second class — thus hinting at the relatively high rank which psychology takes in the 'economy' of culture and education as worked out in our growing system of schools.

The appearance of the long-promised bibliographical section of the *Dictionary of Philosophy and Psychology*,² compiled by Rand, was a notable event. The literatures of these cognate fields are now within the grasp of the reader as never before, and the current additions to bibliography will tend to favor a better grade of scholarship in these departments of knowledge, and possibly check some of the rush 'to print.' The creation of new journals does not give much encouragement to such a hope. The forty-volume old *Zeitschrift für Psychologie und Physiologie der Sinnesorgane* has divided into separate issues, the one for psychology, edited by Ebbinghaus, the other for sense physiology, edited by Nagel. Dessoir is editing the new *Zeitschrift für Aesthetik und allgemeine Kunstwissenschaft*. Abnormal psychology possesses two new channels for publication: the *Journal of Abnormal Psychology*, edited by Prince, and the serial *Klinik für psychische und nervöse Krankheiten*, edited by Sommer. Argentina presents the new *Archivos de Pedagogia y Ciencias afines*, edited by Mercante, and Italy has added to its growing list of periodicals the

¹ *Science*, Aug. 17, 1906, p. 208.

² Vol. III., Parts I. and II., *Bibliography of Philosophy, Psychology and Cognate Subjects*, 1905.

Rivista di Pedagogia, edited by Dedominicis. A new publication is promised, *Zeitschrift für angewandte Psychologie und psychologische Sammelforschung*, to be edited by Stern and Lipmann, as the special organ of the new 'Institute' established at Wilmersdorf (Berlin) by the young *Gesellschaft für experimentelle Psychologie*. This movement is interesting, offering, as it does, the program of a central station and museum for psychological research. It appears that a somewhat similar action is imminent in Paris in the proposed General Institute of Psychology, to be devoted however to the study of subconsciousness, criminality, and allied topics. The lighter side of psychology is added to by the organization of the *Deutscher Monistenbund* at the Zoölogical Institute at Jena, Haeckel being the honorary president — a certain expression of the social instinct in matters philosophical.

The educational interests and the personnel of psychology have also contributed their modest part to the work of the year. The University of Edinburgh created the George Combe Lectureship in general and experimental psychology, with a laboratory, to be maintained by trust funds set apart by the author of *The Constitution of Man*. Thus the phrenologist of a former age — a type of scientist *then* in good repute — benefits both now and in the future the newer science of man. The New Jersey Training School for Feeble-Minded Girls and Boys has established a 'research department,' which makes a beginning in a new field. The new year has recorded the admission of Italy into the American educational alliances which have become rather characteristic in recent years. This exchange of professors seems to show that the printed page, either in the original or in a translation, is probably a most inadequate means for the expression of the personality of the expert. The lecturing visits of Ostwald, of Leipzig, and Janet, of Paris, to several American universities during the year credited the theoretical interpretations and therapeutical applications of psychology, as indicated by their respective themes: 'The relation of energy to life and thought;' and 'The symptoms of hysteria.' More and more do we find psychology becoming a thrifty child in the family of the sciences and feeling itself at home in the world of varied human interests.

AN IMPROVED EXPOSURE APPARATUS.

BY PROFESSOR RAYMOND DODGE,

Wesleyan University.

No psychological instrument is subject to greater modification in response to special experimental conditions than exposure apparatus, and few of our instruments have assumed a greater variety of forms. Uniformity is doubtless impracticable. Yet, in publishing a new type, I am influenced by the belief that a simple apparatus, which satisfies the most exacting experimental requirements of a satisfactory tachistoscope, while it permits the widest variation of illumination and exposure time, will not be unwelcome.

The apparatus was designed to satisfy all the conditions of satisfactory exposure which were developed by Erdmann and Dodge in their *Psychologie des Lesens*, together with some additional conditions indicated by more recent work. These requirements may be summarized as follows: (1) In order to correspond with normal vision, and to prevent the irregular complications which may at any time arise from the partial exposures involved in every successive exposure, the exposure of the entire object should be rigorously simultaneous. (2) Since, in actual tachistoscopic experimentation, the threshold is determined not only by the length of the physical exposure, but also by the physiological preponderance of the exposure over the pre- and post-exposure fields, the relative illumination of the various fields should be capable of experimental modification. (3) The primary fixation point in the pre-exposure field should be capable of accurate adjustment with relation to the object of exposure, so that the point of fixation during exposure may be accurately predetermined. (4) The duration of the exposure should be subject to wide variation without altering the other experimental conditions in any way. The exposure should be noiseless and without distracting phenomena of any sort. (5) The apparatus should be capable of adjustment for either monocular or binocular observation, or for any combination of the two that may be desirable. The present apparatus makes it possible to have a binocular exposure with a monocular prefixation or *vice versa*.

All the forms of exposure apparatus with which I am acquainted

depend on one or more of four general principles: The object may be moved into the field of view. It may be uncovered by a moving screen. An image of the object may be projected by a system of lenses. Or, finally, the object may be exposed by momentary illumination. The transparent mirror apparatus, herein described, depends on the principle of momentary illumination, but it corrects the chief defect in previous apparatus of the same type by providing a suitable pre- and post-exposure field. This provision was developed from the general principle that a glass plate is transparent when the illuminated object lies behind it, while the same plate functions as a mirror when the illuminated object lies in front. The principle is familiar enough in color mixers of various sorts. The problems of construction were to arrange for the placing and illumination of the two objects, and to eliminate the troublesome secondary reflection from the rear surface of the glass plate. The latter problem was finally solved by the use of smoked glass for the transparent mirror. The accompanying diagram indicates the arrangement of the instrument now in use. It is a kind of dark box. The objects are inserted through slits in the sides at O^1 and O^2 . They are illuminated by windows at $W^1 W^2$. The hood shows the position of the observer. Between the observer's eyes and the object to be exposed, a plate of smoked glass TS stands at an angle of 45° to the line of vision. During the exposure of the object, *i. e.*, when O^2 is illuminated, the glass plate serves no purpose whatever. It is simply a part of the transparent media between the eye and the object of regard. Before and after the exposure, on the other hand, *i. e.*, while O^2 is dark and O^1 is illuminated, the glass plate functions as a mirror. It reflects the entire field at O^1 in such a way that the latter appears to lie in the same plane as the exposure field O^2 , directly in front of the observer. If both fields O^1 and O^2 are illuminated at the same time, both are visible at once and appear to occupy the same position in space.

The adjacent windows $W^1 W^2$ provide for the admission of light into the apparatus and consequently for the illumination of the fields $O^1 O^2$. The pre- and post-exposure field (O^1) receives its illumination through window W^1 . The exposure field (O^2) receives its illumination from the other window W^2 . The light from each window falls immediately on a silvered mirror $M^1 M^2$, from which it is reflected at an angle of 90° to the appropriate field. Diffusion within the apparatus is reduced to a minimum by the partitions $SSSSS$ which are provided with openings only just large enough to give a satisfactory view of the two fields. The windows $W^1 W^2$ are glazed with ground

glass to insure an even distribution of light, and are provided with paste-board diaphragms to regulate the intensity of illumination. Between the windows and the source of light some sort of shutter must be

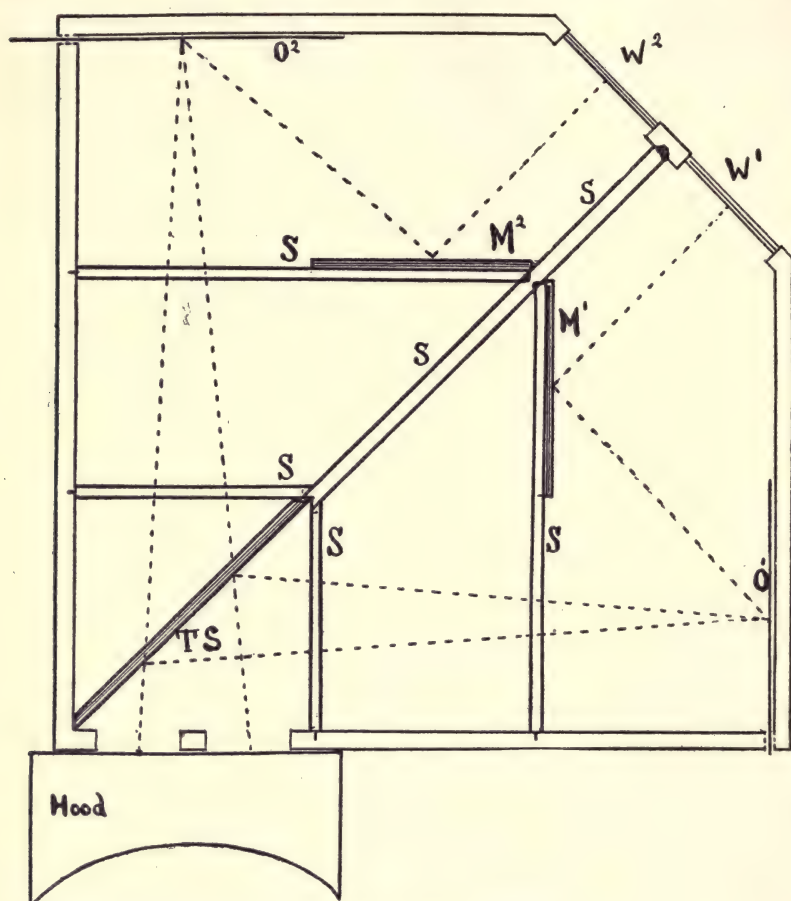


Diagram of transparent mirror exposure apparatus.

$W^1 W^2$. Windows glazed with ground glass.

O^1 . Pre-exposure field.

O^2 . Object to be exposed.

TS . Transparent mirror.

$SSSS$. Screens to confine the illumination to its proper object.

The dotted lines indicate the path of two parallel beams of light.

interposed which will shut off the light from the pre-exposure window W^1 at the same moment that it allows the light to fall on the exposure window W^2 . The form of shutter is altogether a matter of expediency.

In my own apparatus a large disk, carried on the axis of a heavy second-pendulum, is provided with adjustable sectors, which are so arranged that when one window is illuminated the other is darkened. The duration of the exposure is regulated by the size of the open sectors. Since, with a given source of light, the illumination of each field depends only on the size of the diaphragm in the corresponding window, it is quite independent of the illumination of the other field, and the relative illumination of the two fields may be modified to correspond with the most varied experimental needs.

The apparatus conscientiously satisfies the requirements for which it was designed, and in addition it permits a number of valuable adjustments which would have seemed unreasonable to have demanded in advance. The pre-exposure fixation mark together with the entire pre-exposure field disappears completely during the period of exposure and returns again when the exposure is over, without flicker, without observable transition time, and absolutely without motion. With a pendulum shutter between the windows and the source of illumination, there is no preliminary announcement of the exposure except such as may be voluntarily introduced. There is no stimulus for reactive eye movement. There is no instrumental ground for anticipatory reactions of any sort. On a well lighted field the exposed object simply appears for an instant in place of the primary fixation mark and disappears as suddenly as it came, without noise or any other disturbance.

The only inconvenience about the apparatus is the relatively high power illuminant that is needed to offset the waste of light within the apparatus. Excellent results are obtained with an incandescent electric light of high candlepower like the Thompson 150 c.p. stereopticon lamp, fitted with a large condenser to make the rays parallel.

Besides its use as a tachistoscope the instrument is a satisfactory device for color mixing, using either gelatine films or colored papers. It also readily adapts itself to the projection of after-images onto predetermined post-exposure fields. The absence of all disturbing circumstances in the transition to the post-exposure field renders the apparatus unique.

It was recently called to my attention that the principle of the apparatus is freely used by sleight-of-hand performers to produce various illusions of disappearance and transformation. This seems to me rather striking testimony to its efficiency.

PSYCHOLOGICAL LITERATURE.

ANGELL'S PSYCHOLOGY.

Psychology: An Introductory Study of the Structure and Function of Human Consciousness. JAMES ROWLAND ANGELL. New York, Henry Holt and Company, 1904. Pp. iv + 402.

The present status of psychology in America, as regards its tendencies, standpoint and subject-matter, is well exemplified by this book. While it would be unfair to impute eclecticism to the author, since independence and critical thinking are apparent throughout, yet the substance of his writing represents a merging or perhaps better a synthetizing of a variety of standpoints. The author acknowledges the influence of James and Dewey. An influence which is apparent but which does not receive acknowledgment is the Wundtian and, to a lesser extent, that of Baldwin. Other elementary books have been written from the special standpoint of schools or systems, usually with the result that certain doctrines have been unduly emphasized and other views, equally essential, minimized or neglected. It would seem, therefore, that the unique value of this book, as well for the teacher as for the layman, would lie mainly in this catholic account that it gives of the attitude and achievement of the science at the present time.

As regards execution, the work has been well done both in the scope and arrangement of the material and in method of treatment and doctrine. The ground covered by the book is that subject-matter now usually included in elementary courses in psychology, viz., an account of the nervous system, habit, attention, sensation, perception, association, imagery, meaning, reasoning, affection, emotion, instinct and action. In one case only, in the opinion of the reviewer, does the author err in the selection of his material: chapter XVII., on the nature of the impulse, seems to him superfluous. It seems superfluous because the impulse, as used by the author, has no differentia (that the reviewer has been able to discover) that distinguishes it from instinctive and emotive experiences; secondly, because no new matter is introduced in the chapter.

For the arrangement of the subjects one has only commendation. In several ways it is excellent; for example, the grouping together, in chapter IV., of attention, discrimination and association; and again, the connected discussion of reflex action, instinct and emotion.

On the side of method of treatment there is, perhaps, always room for dissent. In general, the plan of the author is, first, to describe the structure of the consciousness that he is considering, afterwards giving an account of its genesis and of its function in the mental economy of the individual. Were this scheme consistently carried out, giving to each standpoint its due, without loss of proportion, the result would be beyond complaint. But as it is, in the present book one feels that the genetic and functional aspects of consciousness have been overdone at the expense of analysis. For example, in the analysis of memory (referring to the topic of that title, p. 185) the aspect that is stressed is that memory is a form of association. The characteristic marks of the memory consciousness, the dating and placing of the event and the warmth and intimacy of the experience, are not mentioned in the discussion of that topic.

Again, in the chapter on the consciousness of meaning one finds a similar lack of analysis, although in this case the difficulty of the matter itself may be responsible for the deficiency. The analysis (p. 210 and p. 215) reveals two points: (1) the existence of an image; (2) the use of the image to convey a definite meaning. What is one to understand by this statement? Surely there is imagery of some sort involved. There is also meaning. Does the author intend that we should understand that the *meaningness* is a unique mental fact invariably associated with verbal imagery? If that is his intention, one must admit that the fact of meaningness is left untouched. Similarly (pp. 210-212), the author criticises, with justness, the view that a composite image, if such a thing were possible, could constitute a meaning. The ground of the objection is that the image could not stand for all 'tables', for example, as our meaning of 'table' undoubtedly does. We must add to the image, whether it be generic or individual, the fact that it is a symbol. But, our objection is, the nature of this symbolism is precisely the whole matter of meaning. What is the relation of the meaning to the image? Is the meaning a unique content, or does it develop somehow from the image? How is meaning to be explained in terms of brain cells? The author touches on some of these points, but without, in the reviewer's opinion, making much headway. But even so, the author might reply, he has as much to say on this matter, and more, than many psychologists. It is unfortunate that the fact has been so largely neglected.

A critical discussion of the doctrines of the book would require too much space. It may suffice to mention the author's attitude on several debatable points. With regard to the question of the nativistic or

empiristic origin of the space consciousness, the author takes the stand that 'the crude, vague feeling of extension' is 'underived by mere experience from non-spatial psychical elements.'

On the other hand, the author is confident "that all accurate knowledge of the meaning of the space relations in our space world, all practically precise perception of direction, position, contour, size, etc., is a result of experience, and could never be gained without it" (p. 141). As to the parts played by the various senses in space perception, the author holds "that all forms of sensations are immediately *suggestive* of spatial attributes, *e. g.*, position, size, distance, etc.; but that sight and touch possess intrinsically and completely the full spatial characteristics" (p. 142). Again, in the matter of the number of affective elements, the author prefers "to abide by the older analysis of pleasantness and unpleasantness as the two modes of affection fundamentally distinct from sensation" (p. 259).

On the whole, and largely in detail, one may say that the book is excellent. It would, however, be much improved as an instrument for teaching psychology if the substance of the topics was more frequently summed up in terse formulæ.

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RAND'S BIBLIOGRAPHY.

Bibliography of Philosophy, Psychology, and Cognate Subjects.

Compiled by BENJAMIN RAND, Ph.D., Harvard University. 2 Parts. New York, Macmillan Company, 1905. Pp. xxvi + 1192.

The two parts together form the third volume of Baldwin's *Dictionary of Philosophy and Psychology*. It is a work of laborious and painstaking scholarship, and Dr. Rand has laid the philosophical world under a debt of peculiar obligation for the service which he has rendered in this compilation. The first part consists of a short section devoted to a catalogue of philosophical bibliographies, dictionaries, periodicals and other collective material. The bulk of the volume, however, is given to a bibliography of the history of philosophy, including philosophers themselves, their works and works upon them. The second part covers the special subjects of systematic philosophy, logic, æsthetics, philosophy of religion, ethics and psychology.

It may seem perhaps ungracious to criticise work which is in the main so excellent and valuable. There are, however, several minor defects which are obvious even from a cursory glance through the twelve hundred pages. The finding of any special topic would have been greatly facilitated if some *guiding word* had appeared at the top

of each page. For instance, I open the first volume at random and find on page 170 the work: *Thompson, J. Arthur. History and Theory of Heredity*. One must look back to p. 166 to find the caption under which this book appears, which happens in this case to be that of *Charles Robert Darwin*. At the top of the page is merely the general title, too general to be a specific guide, *History of Philosophy*. Again, in giving the title of a book of special note, there is inserted immediately following it a supplementary list of the works which have been written upon the book in question. In this connection some indication should be more clearly given by spacing or other device as to where such parenthetical lists of books begin and end. It is not clear to the eye running hastily down the page; as, for instance, the appended list on *Hegel's Outlines of Logic*, on p. 663, or that on *Schleiermacher's Dialektik*, on p. 676.

Again, in the section at the beginning of Part II. on Systematic Philosophy there is no place in Dr. Rand's classification for the subjects of Empiricism and Rationalism, and no bibliography of these subjects given; at least I was able to discover none. Under the head of Logic, there is no reference to the subject of Classification. I afterwards discovered several works on Classification mentioned under the head of Method, but scattered here and there with no attempt to group them together. There should be a reference in the table of contents to so important a subject as that of Classification, and then a cross-reference to the subject of Method where the works on Classification in this bibliography are to be found. Under the same head of Logic, there is no reference to the theory of Statistics, or Statistical Method, and no mention of any works on this subject under the sub-head of Method. There is nothing under the heads of Nominalism, Realism and Conceptualism. I notice also some conspicuous omissions of important works here and there as I have happened to turn to certain topics as the result of a chance suggestion.

Under Evolution, there is no reference to Huxley's *Romanes Lectures on Ethics and Evolution*, or to De Vries' *Species and Varieties: Their Origin by Mutation*. Under Symbolic Logic, Lewis Carroll's *Symbolic Logic*, Couturat's *L'algèbre de la logique*, the volume of Johns Hopkins Studies and the works of Frege are omitted. Under the head of Probability there is no mention of Venn's *Logic of Chance*, or Pearson's *Grammar of Science*, or the works of De Morgan, Quetelet, Galton, Poincaré, Bernouilli and De Moivre.

Under the head of Belief and Evidence, there is no mention of Balfour's *Defence of Philosophic Doubt* or of Greenleaf's *Treatise on the Law of Evidence*.

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GARMAN COMMEMORATION VOLUME.

Studies in Philosophy and Psychology. Commemoration Volume by Former Students of CHARLES EDWARD GARMAN. Part I. Philosophy. Boston, Houghton, Mifflin and Co., 1906. Pp. 401.

The publication of this substantial and beautiful volume as an act of piety and gratitude on the part of the contributors and many other Amherst men, has a peculiar appropriateness because of the unique position which Professor Garman has long held among American teachers of philosophy. One ought not to say that Mr. Garman has given up to a college what was meant for mankind; but it seems evident that he has given up to his students time and personal gifts that, otherwise bestowed, might long since have yielded a much greater harvest of public recognition and outwardly visible results of labor. He appears — while possessing strong and distinctive philosophical convictions of his own — to have largely foregone literary production and the allurements of philosophical controversy in behalf of cherished causes, in order to devote all possible energy and thought to the perfecting of a method of imparting to young barbarians of undergraduate age something of the philosophic temper, a sense of the vital significance of philosophical problems, and some power of philosophizing. He has, like Socrates — ‘avoiding the public places and the forum, where, as the poet says, men acquire celebrity, and concealing himself from the public view’ — been willing to spend his life talking philosophy with a few boys in a corner; and he has shown a somewhat similar vocation for the noble and difficult art of intellectual midwifery. As a result Mr. Garman has become *par excellence* a specialist in the pedagogy of the teaching of philosophy; and the volume appropriately opens with a reprint of a letter (elicited some years ago by President Hall) in which the plan of the unique course in general philosophy at Amherst is indicated, with many original and fertile suggestions which no teacher of the subject can afford to overlook. It is especially fitting that such a teacher, who has quietly devoted the best of his time and thought and personality for a quarter of a century to his students — many hundreds of whom have in that interval passed through his courses — should be publicly honored by such a tribute of appreciation from them, and by the publication of selections from the work of those whom his teaching has led into the professional pursuit of philosophical studies.

Of the eight papers in the philosophical part of the volume, three might perhaps as fairly be classified as psychological; and one is a

study in statistics, albeit of decidedly philosophical bearings : a critical résumé, by Professor W. F. Willcox, of the evidence tending to the conclusion that the population of Europe has trebled in a century and a half, that the number of persons of European stock has increased nearly fourfold, that the contact of other races with European culture has (contrary to the usual belief) on the whole tended to the marked increase of the native stocks, and that consequently the population of the globe is probably half as great again as in 1750. The only discussion of fundamental philosophical issues is contributed by Professor Woodbridge, in a paper on 'The Meaning of Consciousness.' Where two or three philosophers are gathered together, a fresh refutation of idealism is now to be expected ; and Woodbridge furnishes that feature of the present feast in an interesting piece of reasoning, that is, however, hardly likely to convince the unconverted. The argument is based upon the attempt (already made familiar by Woodbridge himself, as well as by James, Dewey, Perry and others) to eliminate from the notion of consciousness the dualism of 'subject' and 'object' which has hitherto been supposed to be of its essence — to define reality in its primary nudity (*i. e.*, stripped of the trappings furnished it by reflective reinterpretation) as 'pure' or 'immediate' experience, and consciousness merely as a kind of relation between the parts or ingredients of this universal mother-liquor. Woodbridge here, however, seeks to advance the argument a stage, by defining more precisely what sort of relation within experience consciousness is — *viz.*, that connection between experiences whereby one 'means' another — as, *e. g.*, water is that which 'means that it will quench thirst.' On the whole enterprise of these metaphysicians (which is important if successful) and on Woodbridge's contribution to it, certain remarks seem still pertinent. (1) The procedure of the argument consists in setting aside idealism by denying the dualistic antithesis of thought and thing in which the idealist's arguments find their point of departure. But it is not clear why the resultant identity should be called realistic any more than idealistic. If, as James declares, 'Thoughts are made of the same stuff as things are,' one is impelled to ask which stuff that is, or whether it isn't really either. When the proverbial two snakes reciprocally swallow one another, it seems mere fondness and partiality to call the resulting absence of snake by the name of either animal. (2) In reality, however, the relational theory of consciousness does not reduce thoughts and things to even a neutral identity, but is rather itself the seat of a pathetic internal disruption. For its logic makes straight for idealism, if not for the solipsism of the specious present, while the

cravings of its partisans seem to be all for a realism that may appear respectable in the eyes of natural science. True it is that in immediate experience *Gedanke* and *Gedachtes* are identical and indistinguishable; that there are just present 'facts.' But these facts are absolutely evanescent (or perhaps one should say, non-temporal); they have nothing in common with the explicitly projected and perduring 'things' of realism and common-sense. The existence of 'things' remains in the new doctrine just as purely inferential and external as ever. Relationism may show us, at any single moment, a mass of content, which may perhaps be called indifferently object or state of consciousness; it may show us also, in successive moments, a series of alterations of content; it may even (if we glide over certain logical difficulties) be supposed to show us relations and 'pointings' between these masses of content; but it has no warrant in its own principles for maintaining the existence of anything outside of the present mass of some specified moment. The 'pointings' must be wholly 'within experience.' But the essence of realism is the assertion that 'presence' is wholly unessential to real existence, and that there are entities that abide independently of those temporal shiftings and disappearances of elements that we know to be characteristic of all experience. How one can assert realism without reaffirming the dualism which the relational theory got its start by denying, is a mystery hard to understand. The paradox seems particularly glaring in Professor Woodbridge's case because he is, with one exception, the most emphatically realistic — in the old-fashioned way of realism — of all the representatives of the relational theory. (3) In the present study Woodbridge nowhere clearly defines the term 'meaning,' upon which all the novel part of his argument turns. The term is by no means luminous or unambiguous; and the illustrations of its import which are offered (p. 159) in lieu of a definition make it more rather than less difficult of understanding. Satisfactory criticism of the proposed addition to the relational theory is therefore hardly possible until the conceptions involved are set forth with greater fullness and definiteness.

Two studies, one chiefly phylogenetic, the other analytical, in the psychology of the moral consciousness are among the recent symptoms which encourage the hope that ethics, long a somewhat stationary science, is about to make some real progress and to learn the use of some new categories, through a more adequate investigation of the moral 'attitudes' and the processes of moral judgment as they actually occur. The first paper, by Professor Tufts (who has also served as chairman of the committee responsible for the editing of the volume),

gives a judicial and decidedly illuminating discussion of the results of recent work in psychology and anthropology that bear upon the order and upon the causal factors of moral evolution, with respect both to the 'form' and the specific content of morality. The paper is exceptionally well-balanced and comprehensive; but what seems to me the most important factor of all is precisely the one which it (like most studies in the subject) treats most inadequately. The peculiarity which above all makes man capable of morality surely is the fact that he is self-conscious and that he has certain quite special desires and cravings connected with his consciousness of self; that he is, *e. g.*, preëminently 'approbative,' desirous that his ejective self shall be thought of by others in a certain manner, shall be credited by them with certain predicates; and that, secondly, he is powerfully moved by the desire that he himself shall be able to think of that objective self of his as the legitimate subject of predicates that he instinctively admires, or has imitatively learned to approve, or at least not to disapprove, in others. It is upon these peculiar desires and emotions of the self-conscious, would-be-self-approbative animal, that society chiefly works in bringing about an increasing control of primary impulses by 'obligatory' moral imperatives. The genetic psychologist of the moral consciousness is, therefore, called upon first of all to trace the beginnings and early phases of self-consciousness, the origins and conditions of 'approbativeness,' the transition from this to the desire to conceive of the self as being intrinsically approvable; to show the relations and inter-workings of this and the other factors in moral control, and the particular kinds of moral 'content' that fit most easily into this 'form' of ethical thought and feeling at different stages of social evolution. Tufts by no means entirely neglects this aspect of the moral consciousness, but his treatment of it seems to me much too casual.

One of the important purely 'formal' elements in morality that depend entirely upon the dialectic of self-consciousness, is especially emphasized in Professor F. C. Sharp's careful and penetrating analysis of the moral judgment, *viz.*, its projection of all selves, including the agent's, into a cold and impersonal world, where all appear in the same light and are judged by the same standards, so far as the essential conditions under which they severally act are assumed to be the same. 'Moral approbation,' says Sharp, 'is differentiated from other forms of approbation by the fact,' not only that it has a peculiar object, but also that 'its grounds are such that they apply equally to every one who may be called upon to act in the same situation'; and one may add that, in certain phases of moral development, the addition

of new content to a current code of approbations and disapprobations is largely due to the pressure of this requirement of formal universality; what is first merely disliked (because of some unreflective feeling of sympathy or antipathy) in an act or characteristic of another, is presently found to be essentially analogous to something hitherto passed without censure in oneself or a third person; and it comes thereupon to be condemned in these latter cases also. The point is, of course, nowise new, but it is rightly declared by Sharp to be fundamental in any just account of the implications of the moral judgment as such. Less convincing is Sharp's statement of the other half of the differentia of the moral judgment; the primary specific mark of that judgment, he tells us, consists not in any special emotional concomitants, but in the object of the judgment, which is always 'the end that the agent aims to bring about.' But men seem to approve or disapprove (with the impersonal universality above mentioned) without any conscious reference to the 'aims' or 'purposes' of the agent; moral judgment seems more often, in fact, to be interested in acts as expressions of qualities of personality or temperament, and as indications of the presence or absence of certain admired or condemned emotions and social attitudes — or, when it turns to the more objective aspect, it is more often interested in the 'fitness' of the act to the proprieties of the situation — than it is in the end of the act. In the current code, *e. g.*, profanity and obscenity are 'morally' reprobated, not, seemingly, because the user of such modes of speech is supposed to aim at bad ulterior ends, but because of a felt ugliness or 'vulgarity' in the state of mind presupposed by such speech. Ordinary ethical thought, indeed, seems more often than not to forget the teleological meaning of volition; it is concerned less with what choices come *to* than with what they come *from*. Sharp does not seem to me to do justice to the importance of the quasi-æsthetic type of moral judgment, nor to recognize sufficiently how implicit in much self-judgment (which should be treated in such a study as a separate phenomenon) is a subtle histrionizing, an appeal to Adam Smith's imaginary and impartial spectator. This seems due partly to an insufficient preliminary consideration of the methodological difficulties of Sharp's undertaking — which is, not to set forth how people ought to make moral judgments, but how they actually do. It is hard, in such an inquiry, to make sure that one has taken account of the whole relevant range of variation in mental processes, and in the use of such terms as 'moral,' 'right,' *etc.*; and it is hard not to slip over from an analysis of the implicit meaning of people's thinking in these matters to a statement

of what they *would* think if they thought quite rationally and consistently. I am not sure that Sharp always escapes this illicit transition. — Of ethical interest also is Mr. Robert A. Wood's essay, 'Democracy a New Unfolding of Human Power,' which, however, consists rather in fine-spirited and stimulating 'moral ideas' than in 'ideas about morality.' It is, perhaps, from this point of view no demerit in the paper, that its writer's faith in the practicability of the extension of democracy (which he hardly very clearly defines) to new fields — *e. g.*, to industrial organization — rests chiefly upon the evidence of things not seen among the present facts of social and industrial experience. — Dr. E. L. Norton contributes an interesting and instructive study of a comparatively neglected question, the nature and relative importance of the 'intellectual' (*i. e.*, the relation-apprehending) factor in musical appreciation. Though placed in the philosophical part of the volume, the paper falls rather, for its adequate consideration, within the province of the psychological æsthetician.

Two articles on pragmatism deal rather with certain historical relations of the doctrine than with its logical value. Professor W. L. Raub contends that pragmatism is identical, in substance, with Kantianism; *i. e.*, with the doctrines of the *Transcendental Æsthetic* and *Analytic*. An exceptionally clear and scrupulously well documented summary is given of the pragmatic epistemology. But the proposed parallelism can hardly be made out. It is impossible to discuss here all the suggested similarities; but one may remark that to hold a given principle (*e. g.*, the application of a given 'form' or category) to be an *a priori* condition of all possible experience is not the same as holding it to be *useful* in the *reconstruction* of an immediate experience in order to allay a felt dissatisfaction. Some pragmatists, it is true — even Professor James, among them — have gone to singular lengths in admitting that there exist *a priori* truths which are for us genuinely necessary, *i. e.*, intellectually ineluctable. And by citing these expressions Dr. Raub is able to make James and others appear incongruously enough among the prophets of Kantianism. But what this means is not that Kant was a pragmatist, but that some pragmatists have in moments of inconsistency gone back to Kant. Surely (unless the programme of pragmatism requires a general preliminary deliquescence of all logical distinctions) we have a right to ask that those who call themselves radical empiricists shall abstain from the use of necessary and *a priori* truths.¹ The concluding paper of the group, by Professor E.

¹It will not do for such 'soft' pragmatists to take a leaf out of Mr. Spencer's book, and say that what were once mere voluntary postulates, selected because

W. Lyman of Bangor Theological Seminary, points out a contemporary *rapprochement* between theology and philosophy through the growth of the historical method on the side of theology, and of a pragmatic theory of knowledge on the side of philosophy.

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Studies in Philosophy and Psychology. Commemoration Volume presented to Professor CHARLES EDWARD GARMAN by his Former Students. Part II. Psychology, comprising:

Influence of Surrounding Objects on the Apparent Direction of a Line. EDMUND B. DELABARRE. Pp. 239-295.

Beginning a Language; A Contribution to the Psychology of Learning. EDGAR JAMES SWIFT. Pp. 297-313.

An Appeal from the Prevailing Doctrine of a Detached Subconsciousness. ARTHUR HENRY PIERCE. Pp. 315-349.

The Cause of a Voluntary Movement. ROBERT SESSIONS WOODWORTH. Pp. 351-392.

An Experimental Test of the Classical Theory of Volition. CHARLES THEODORE BURNETT. Pp. 393-401.

The method of the experiments reported in the first paper was to require the observer to set a straight line so that it seemed to him to be in a vertical or horizontal position. Its departure from the true vertical or horizontal was then measured. In some cases the line was a single luminous line in a dark field. This, however, can not be regarded as a standard case with which to compare other cases, for the results show that the amount of departure of this line from the true vertical or horizontal was in excess of the departure of lines set in a field containing a great variety of other visual objects. This result, the author explains, is due to unavoidable and changing complexities in even the simplest fields of vision. After making tests with a luminous line in a dark field, a great variety of modifications of the field were introduced. Figures of all forms and colors were introduced at the right and left, or above and below the line. Thus, distracting objects were, in some cases, single bright spots placed at various distances, or more elaborate figures or lines. The results of the experiment are presented in

of their survival-value, have now become necessities of thought. For that hypothesis is not merely intrinsically unverifiable, but is, according to its own terms, inconceivable. If the opposite of a given proposition cannot be conceived, it, *ipso facto*, cannot be conceived to have once been inherently conceivable.

numerous tables. In general, it may be said that the presence of distracting objects in the field may affect the apparent direction of the line in such a way as to cause either a positive or negative deflection, that is, a deflection toward the object or away from it. These influences exerted by various objects are also quantitatively of the greatest possible variety.

With results of such complexity before him, the author attempts to reduce all the different cases to a single principle of perception. The important consideration, according to his view, is the direction of attention. If attention is drawn toward the object in the field of vision, the line will also be deflected toward the object. If, on the other hand, the effort to resist the distraction of the object is strong enough to attract the attention away from the object, the line will be deflected away from the object. In attempting to reach some definition of the nature of what is here called attention, the author after excluding other possibilities comes to the following general conclusion: "The only view that appeals to me as at all adequate to account for the facts is that the variations in the line's apparent direction are due to the presence of particular muscular tensions" (p. 286).

From what has been said of the results of the investigations it is obvious that no single type of muscular tensions can be made to serve as the explanation of all the results. After stating the general principle, above quoted, the author makes little reference to his tables. He takes up chiefly certain evidences drawn from introspection and concludes his explanatory discussion as follows: "But the full explanation involves so many intricacies that I must postpone its further elaboration. Just now I must content myself with the statement that I know that muscular tensions of this nature exist and modify the apparent direction of lines; and with expressing my belief that they furnish the ultimate explanation of all the spatial facts recorded in this paper" (p. 287).

The value of this theoretical conclusion is somewhat limited, because the author has not made any effort to meet the large body of evidence that has recently been gathered from photographs of eyes, adverse to his introspection and theoretical conclusions. The empirical results of the investigation confirm very fully the well recognized general principle, that every part of the field of vision is interrelated with every other part, so that perception of any line in the field of vision is a general and highly complicated process of perception.

The second paper, on the learning of language, continues the line of work which Swift has reported in earlier papers. In this experi-

ment the author has undertaken to determine quantitatively the progress which he made in learning the exercises in a primer of the Russian language. He had no acquaintance, prior to the beginning of the experiment, with Russian; and his determinations, from the nature of the case, are very similar to the determinations which might be made on a child learning some complex subject in the school. The results of the investigations are presented in a curve which shows the usual irregularities and plateaus of all practice curves. In his discussions of the results the author explains some of the most striking irregularities in the curve; and in conclusion he undertakes some theoretical interpretations of the nature of the habit under investigation. He repeats the argument which he has presented in an earlier paper, that the 'habit hierarchies' of Bryan and Harter are not as distinct as the earlier authors indicated in their paper on telegraphic language. The different constituents of a habit are probably all present in some degree from the first. The more complex habit factors are less pronounced at the beginning of the experiment and gradually come into the ascendancy. Their final development is what gives the distinctive character to the later periods of the curve after the plateaus have been passed.

The third paper, by Prof. Pierce, is a critical discussion dealing with the use made by various writers of the concept of subconsciousness. The first part of the paper deals with various possible definitions of the term. The second part reviews very briefly the evidences upon which authors depend for the assumption of the existence of the subconscious. Third, there follow certain questions which indicate so clearly the critical attitude of the author that one or two quotations may be made from these questions. For example, the following question is raised: "Is the subconscious supposed to have a cerebral basis?" (p. 324). Again, "Does the term 'subconsciousness' refer to an hypothesis submitted for the explanation and interpretation of certain observed facts, or does it stand for a demonstrable and already demonstrated reality?" (p. 325).

In the fourth part of the paper there follow a number of discussions which take up the matter in detail. Here the author has attempted to show that there is no evidence whatsoever for the assumption of a separate subconsciousness to explain automatic writing. Such activity is nothing more nor less than a complex form of that which can be observed in our ordinary habitual processes of controlling the hand in writing. Crystal vision and the insights of genius are only the development into clearly conscious processes of impressions

which have been presented in the field of partial attention, or have been worked out through fortunate series of associations and thus represent merely the products of automatic cerebral fusion. Sub-consciousness should, therefore, be treated as synonymous with brain activity wherever it is intended as a valid scientific hypothesis.

The paper by Professor Woodworth is a good illustration of a series of systematic observations made under carefully prepared conditions. A number of simple voluntary movements were executed by trained observers. The observer was required in each case to discover, if possible, the exact character of the mental state which preceded the movement.

The conclusions of the series of observations were very largely negative. It is shown clearly that kinæsthetic images are not present in the majority of cases. It is shown, in the second place, that no image of any kind, either visual or tactual, is required as a cue for voluntary movement. It is shown, in the third place, that the content of consciousness just prior to the movement is very frequently altogether too inadequate to account for the particular movement which is later executed. These negative conclusions having been established and elaborated by a careful discussion of the observations reported, the author does not make very clear what are his positive explanations of the necessary antecedents of voluntary movement. Certain suggestive hints are thrown out, as shown in the following sentences, which may be quoted: "In short, the nervous system may become set or adjusted for a certain act, and remain so for a time without a continuance of clear consciousness of the act; or the system may be so set as partially to determine the act, the complete determination being effected in a subsequent moment" (p. 389).

Again, in a following paragraph this statement is made: "The complete determinant of a voluntary motor act — that which specifies exactly what act it shall be — is nothing less than the total set of the nervous system at the moment. The set is determined partly by factors of long standing, instincts and habits, partly by the sensations of the moment, partly by recent perceptions of the situation and by other thoughts lately present in consciousness" (p. 391).

This paper, in common with a number of recent investigations, calls attention very clearly to the importance of treating movement as a subject for vigorous psychological examination; and it also makes impossible the former easy-going discussion of the relation between volition, sense impressions, and mental imagery. The relation under discussion is one of the very first importance for psychological explana-

tion, and obviously, from such observations as those here elaborated, it is one of the most difficult experiences for complete introspective analysis."

The last paper of the series, by Dr. Burnett, deals with much the same problem as that taken up in Professor Woodworth's paper. The result is summarized by the author as follows: "The results of the foregoing experiments seem to indicate that in the limited field under consideration, that of voluntary movements of the back-and-forth type, the imagination of neither resident sensations from the limbs nor of remote sensations as from the eye, ear, or skin, showing how the moving part looks or sounds or feels, can furnish an adequate cue for the occurrence of actual movements at a maximum rate" (p. 401).

This conclusion is based on a series of tables in which the rate of imagined movements is compared with the rate of real movements. The rate of imagined movements is reported as slower than the rate of real movements; and this leads the author to the general conclusion that the imagined movements cannot serve as the cue to the real movement.

Unfortunately the statement of the method of the experiments is so curtailed and the meaning of units in the table so obscure that it is quite impossible to understand how the data were obtained. The experiments are on a subject of such importance, and the conclusions seem to be so fully established in the author's mind, that it is doubly desirable that the character of the experiments be made clear.

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PHILOSOPHY OF EXPERIENCE.

Avenarius' Philosophy of Pure Experience. NORMAN SMITH.
Mind, April, 1906.

While Avenarius discovered a genuine fallacy in the introjectionist argument, Mr. Smith believes that both his account of its origin, and the applications which he derived from it, are open to serious objections.

In *Der Menschliche Weltbegriff*, Avenarius attributes all the distinctions between inner and outer, self and not-self, subject and object, and soul and body, to the fallacy of introjection, and accordingly repudiates them in the interests of his own doctrine of 'pure experience.' In reply, it is maintained that these distinctions are not only legitimate, but that they do not owe their origin to introjection. The

distinction between objects and our perception of them must first have been present in our own consciousness, before we could have begun to infer it in others, and so started the process of introjection. These dualisms really owe their origin simply to the spatial externality of objects to our own bodies. Avenarius is not justified in finding an instance of introjection in the animism of children and savages. Tylor has satisfactorily explained the origin of animism in a much simpler manner, as the natural interpretation of certain concrete phenomena, viz., sleep, dreams, and death. Nor can animism be regarded as the cause of these dualisms, though it is a crude attempt to explain them, and leads to more fruitful and absolutely legitimate philosophical developments.

In some later articles published in the *Vierteljahrschrift*, Avenarius charges the source of subjective idealism to the introjectionist fallacy. While Mr. Smith believes that subjective idealism logically presupposes some such fallacious alternation between an assumed realism and idealism, and that Avenarius has performed a valuable service to philosophy in showing this, he maintains that Avenarius is wrong in attributing the origin of subjective idealism to introjection. Its origin is a purely philosophical development, based upon the physical and physiological difficulties involved in explaining the relationship of matter and consciousness, and it did not appear until the age of Descartes, at least in an at all definite form.

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The Experience-Philosophy. WARNER FITE. Phil. Rev., 1906, XV., 1-16.

The chief purpose of this article is to show that the experience-philosophy, resting as it does upon the proposition that experience is immediately given and prior to the world of things, exhibits a serious fallacy. The series of experiences and the present experience are found to be intimately connected with and determined by things in space and time. (1) The *past* experience and the past fact not in experience are both mediated, the one by memory and the other by inference. Both processes, however, turn out to be objective; for the criteria of a true memory-picture are clearness, which stands for consistency of external detail, and the 'personal character,' consisting in definite bodily relations existing between the subject and the perceived object, to which the purely subjective element of experience is always subordinate. (2) The real *present* experience is distinguished from

the imagined experience by a greater degree of clearness, and clearness refers, we have found, to coherency of mechanical relations. Even the subjective aspect of the present experience depends upon objective conditions. Thus the world of experience is inseparably united with the world of things, and the experience-philosopher by limiting reality to the former assumes a fallacious position. In rejecting experience as exclusively valid we do not accept the external fact as the ultimate. Neither is an absolute datum, and the search for one is futile and unnecessary. The reasonable course lies in accepting both the idealistic and realistic theories for the truth each contains, using a datum, not for a solid foundation, but for purposes of further investigation.

Two criticisms may be suggested, though there is not space in which to develop them. First: the two phrases, 'the world as experience' and 'the world as my idea,' are incorrectly treated as equivalent; and second, it does not seem to the writer of this notice that Dr. Fite succeeds in his attempt at placing 'experience' and the 'thing outside it' upon an equal footing: on the contrary, he 'derives experience from the world.'

HELEN GARDNER HOOD.

WELLESLEY COLLEGE.

MEMORY.

Ueber Sinnesempfindungen und Gedächtnisbilder. VICTOR URBANTSCHITSCH. Archiv f. d. ges. Physiologie (Pflüger's), 1905, CX., 437-491.

While this paper records observations upon after-sensations and memory-images in each of the sense realms except the olfactory, kinæsthetic and organic, the chief interest attaches to the phenomena observed in the fields of audition and of temperature sensation. After listening to a tuning-fork, six out of ten observers were able to detect after-sensations which, in the case of three observers, differed in pitch from the normal tone by a few vibrations. The objective and subjective tones sounding together could be heard as distinct but did not beat. In each of the sense realms, details not detected in the original sensation are discoverable in the after-sensation. In this connection the author reports his studies upon the hard-of-hearing, in whose experience auditory after-sensations and memory-images are of unusual importance. Localization of sensations is treated at length, the conditions affecting the spread of temperature sensations and after-sensations being described most fully. The article contains no bibliography and no discussion of the work of other experimenters.

W. V. D. BINGHAM.

UNIVERSITY OF CHICAGO.

BOOKS RECEIVED FROM DECEMBER 5, 1906, TO JANUARY 5, 1907.

- The Psychic Treatment of Nervous Disorders.* P. DUBOIS. Trans. by S. E. JELLIFFE and W. A. WHITE. New York and London, Funk & Wagnalls, 1906. Pp. v + 466.
- Le Duplicisme Humain.* C. SABATIER. Paris, Alcan, 1907 (for 1906). Pp. xviii + 160. Fr. 2.50.
- Mental Development in the Child and the Race. Methods and Processes.* J. MARK BALDWIN. 3d ed. (7th printing). New York and London, Macmillans, 1906. Pp. viii + 477.
- Social and Ethical Interpretations in Mental Development.* J. MARK BALDWIN. 4th ed. New York and London, Macmillans, 1906. Pp. xxvi + 606. \$2.60 net.
- Lectures on the Methods of Science.* Ed. by I. B. STRONG. Oxford University Extension Lectures, 1905. Oxford, Clarendon Press; New York, Froude, 1906. Pp. viii + 249. [Lectures by nine Oxford authorities on a variety of topics not well covered by the title.]
- Le Mensonge de l'Art.* FR. PAULHAN. Paris, Alcan, 1907 (for 1906). Pp. 380. Fr. 5.
- Eine Untersuchung über Raum, Zeit, und Begriffe vom Standpunkt des Positivismus.* E. ZSCHIMMER. Leipzig, Engelmann, 1906. Pp. 54.
- Le Crime, Causes et Remèdes.* C. LOMBROSO. Paris, Alcan, 1907. Pp. xxiv + 583. 10 fr.
- Demifous et Demiresponsables.* J. GROSSET. Paris, Alcan, 1907. Pp. 297. 5 fr.

NOTES AND NEWS.

FURTHER particulars are at hand of the Institute recently organized by the German 'Gesellschaft für experimentelle Psychologie,' as announced in the November BULLETIN. The Institute is to be open from November 1 to February 28 and from May 1 to July 31, for the pursuit of investigations. The library and archives are accessible to all who are engaged in scientific investigation, whether members of the society or not; a moderate charge is made for consulting the ar-

chives, which under special circumstances will be sent to distant points for consultation. The committee in charge of the work consists of Professors G. E. Müller, Meumann and Sommer, and Drs. Stern (director) and Lipmann (secretary). Each topic of investigation undertaken will be in charge of a special 'Commission,' appointed by the Committee and consisting of the director and secretary and others interested in the particular subject, non-members of the society being eligible to membership on these Commissions. The working out of the scheme will be watched with interest by experimentalists in this country who are working for the cause of inter-laboratory coöperation.

WE have received the preliminary program of the Second International Congress of School Hygiene, to be held in London August 5-10, 1907. Among the Sections is one on 'The Physiology and Psychology of Educational Methods and Work.' (Office: The Royal Sanatory Institute, Margaret St., London, W.)

WE note also the announcement of an international course of lectures on Juridical Psychology and Psychiatry to be given at Giessen under the direction of Professor Sommer. The program includes twelve lectures by Professors Sommer, Aschaffenburg, Mittermaier and Dr. Dannemann.

DR. HENRY RUTGERS MARSHALL, of New York City, was elected president of the American Psychological Association, and Professor H. N. Gardiner, of Smith College, president of the American Philosophical Association, for the coming year. Reports of the December meetings of the Associations will appear in our next issue.

PROFESSOR HUGO MÜNSTERBERG, of Harvard University, is in Germany on a leave of absence extending from November to January.

IT is stated that Professor Guido Villa, author of the well-known work *Contemporary Psychology*, has been appointed to the chair in philosophy at Pavia made vacant by the death of Professor Cantoni.

DR. SHEPHERD IVORY FRANZ has accepted the position of psychologist in the Government Hospital for the Insane, at Washington, in addition to the professorship of physiology in the George Washington University.

AT the University of Toronto, Dr. T. R. Robinson and Mr. W. G. Smith, hitherto lecturers in philosophy, have been appointed assistants in the psychological laboratory also. M. F. L. Barber is instructor in philosophy and class assistant in the laboratory, and Miss M. Jansen, Ph.D., class assistant and librarian of the laboratory.

THE PSYCHOLOGICAL BULLETIN

AN ILLUSTRATION OF THE PSYCHOLOGY OF BELIEF.

BY AMY E. TANNER,

Wilson College.

An interesting case in the psychology of belief has recently come to my notice, which I give here in the words of the subject of the experience.

“When I was young I went through the usual process of conversion, and found much comfort in my communion with God. My faith in God’s love was shaken after a year by some trying personal experiences, and when their bitterness had passed away my reason would not allow me to believe again in the church dogmas. For a period of six or eight years I was hostile to the church, and then, as I became accustomed to my unbelief and found others who thought with me, my feeling died down and my attitude became one of genuine indifference. By degrees I came to believe that what men call God is the impersonal first cause of the universe, and that prayer has no value whatever as prayer, since there is no God who hears.

“This state of mind lasted for about fifteen years, during which I went through various experiences of sickness and loss of friends without feeling in the least the need of belief in a personal God. It culminated in a physical breakdown and a moral crisis in which I first lived a life of deception, and then by reason of some tendency still utterly inexplicable to me, found myself obliged to fight and conquer the temptation. It is impossible to state too strongly my feeling of being the creature of an outside force both in the yielding and the conquering. It seems as if my own consciousness were literally only a spectator, while some deeper race or instinctive self held the stage.

“Following this came a period of several years, when my health improved steadily, but I seemed to be nearly at a standstill intellectually and morally, save that I constantly became more sensitive as to my relations to other people. Then one day I found myself holding

as the very center of my life an ideal which suddenly appeared to be monstrous, to be filled with tendencies to wrong action. I realized that I was in truth little better than when I had yielded, since I lived in thought the same life of deception and continued to set before myself an ideal unattainable by any honorable means. I saw clearly enough that I should have to give up that ideal or become openly bad, and while I shrank with horror from the sin that lay open to me on one side, I shrank almost equally from the nothingness awaiting me if I uprooted the ideal. What then could serve as the center for my thoughts to cluster about? When attention relaxed, upon what could my worried mind sink? Where could my pent-up emotions, my starved instincts, find their satisfaction? What a shrivelled, repressed nonentity my personality would become!

"The days went on and the struggle became more desperate as my purposeless and hopeless life grew more monotonous. I tried to adopt the ideal of social service, but service alone is drudgery to one who lacks other ideals. Two factors especially contributed to my despair. The first was the feeling of my own insignificance or uselessness in the world of people, and the second was the paralysis of much of my emotional and intellectual self which followed upon the removal of my old ideal. My thoughts and feelings were constantly turning towards and groping for this loved and customary object. When they did close upon it, shame and remorse followed; but when they found only nothingness, the sense of being baffled, of stepping off into the darkness, was indescribably painful.

"During this time, my attention was called to the possibility of a new sort of belief in God. I felt that if I had belief in a personal God, it would serve as the focus for my thoughts, and would also remove the feeling of my worthlessness, but it seemed to me utterly futile to attempt to demonstrate the objective existence of such a God. No philosophy had ever proved more than the existence of a first cause, and science was emphasizing at every point that this cause was impersonal. Then on what possible ground could one reasonably assume a personal God?

"Both Kant and modern psychology justify one in assuming as true a theory which is essential to the best living. The burden of proof comes to show that it is actually essential. If living demands the assumption of a personal God, then it is reasonable to make that assumption; but does it demand it? Here I remained for some time. I questioned whether I could not in time conquer this desire as I had others, but I found myself standing on the brink of the abyss again and

again, and I became so harassed and at last so afraid that I was forced to admit that I could see no way of relief unless there were a something to help me.

“But then came the question of whether I could use the concept of a personal God without belief in its objective existence. Could I try it as a mere working hypothesis and expect to get any valuable results? Anyhow, I saw nothing else to do, so I said to myself that it does not matter in the least whether God exists outside of the minds of men. If one can get strength and comfort from talking to God as if he exists, it makes no practical difference even if the sense of his love and help is an illusion created by one's own mind like all the visions of the martyrs and saints. Such illusions remake the world at any rate. On the other hand, if God really does exist, one can best reach him by prayer and thought of him. It seems almost ludicrously self-evident that in either case one will not lose practically though one may be wrong theoretically.

“Therefore I deliberately set to work to reacquire the sense of God's presence which I had not had for nearly twenty years. I reinforced my reason by reiterating my reasons for assuming such a personality, and I prayed constantly after the fashion of the old sceptic: ‘O God, if there is a God, save my soul if I have a soul.’

“Then one night after a week of this sort of thing, the old sense of God's presence came upon me with overpowering fulness. I can not express the sense of personal intimacy, understanding and sympathy that it gave to me. I felt the thing—whatever it was—so close to me, so a part of me, that words and even thoughts were unnecessary, that my part was only to sink back into this personality—if such it were—and drop all worries and temptations, all the straining and striving that had been so prominent in my life for years and years. Then, as I felt consolation and strength pouring in upon me, there came a great upwelling of love and gratitude toward their source, even though I was all the time conscious that that source might not be either personal or objective. It *felt* personal, I said to myself, and no harm would be done by acting as if it were so.

“This experience lasted for two days in nearly its original strength. Every time that attention relaxed from my tasks, the presence was there, and it was the last at night and the first in the morning in my consciousness. Gradually it became less vivid, but at times it still recurs with its original force.

“On the practical side its value up to now—after a period of three months—has been permanent. I find my thoughts falling back upon

the idea of this presence as soon as I get into any sort of trouble or perplexity, and the invariable effect is to calm me and to enable me to take a wider outlook. I am so curiously conscious of it as a person that I find myself checking certain thoughts and acts just as I would check words if some one else were here, and I break out into conversation with it in the same incidental fashion as I do with a friend who happens to sit in the room where I am working.

“So far as the theoretical question is concerned, I cannot say that I am any nearer a solution than before, nor do I see any possibility of a solution. But I am daily demonstrating that the assumption of God as a reality is of use to me, and I care less and less whether he exists outside of my own consciousness or not. If he is indeed a mental creation alone, I only marvel the more at the power of the human mind, and still find the idea one of the most valuable in living.”

The writer of this account seems to have had an experience of a truly mystical character. The curious thing about it is that she can admit the possibility of the presence being wholly subjective and yet apparently get the same emotional warmth and practical efficacy as if she were sure that it was objective. It will be interesting to see whether she maintains this balance, or once more loses the sense of the Presence, or else becomes convinced of its objectivity.

PSYCHOLOGICAL LITERATURE.

PSYCHOLOGY OF RELIGION.

Education in Religion and Morals. G. A. COE. Chicago, Fleming H. Revell Company, 1904. Pp. 434.

Professor Coe attempts in this book to apply the teachings of modern psychology and pedagogy to the problem of religious education. The task is a large one and the correlation of the material involved is far from being a simple undertaking. It is with a vivid realization of the difficulties inherent in the problem itself that the following review and criticism of the work is offered.

The author shows, in the first place, that religious education should be considered as an organic part of general education, and that its object, specifically, may be said to be either the development of the religious nature, the transmission of the religious heritage of the race, or the adjustment of the race to its divine environment.

It is pointed out that the notion of the total depravity of childhood is unchristian; that the view of the child as a plastic, unformed being needing development is the true Christian view and one that is as well in accord with modern pedagogy. There then follows a suggestive discussion of the most vital points of modern educational theory. This is used as a basis for the theory of religious education which follows. The chief points taken up are: education as a universal necessity; its method that of development; its present foundation upon a truer theory of child nature; its growing concreteness, the increasing breadth of its scope, and its social character. With all of these principles religion is in essential agreement, and hence an education in religion should provoke no conflict between religious thought and the results of modern educational theory. The truth of this position is especially illustrated by play, recognized to-day as of such genuine educational value, and shown to be of equal importance in religious education. The older view that religion must be absolutely divorced from all that is sportive is sharply criticised. Too often have children been taught 'to think of their most free and spontaneous activities, their plays, as having no affinity for religion, and then we wonder why religion does not seem more attractive to them as they grow toward maturity' (p. 144). Hence, "If the thought of God or of Christ kills the joy of

games and plays, that merely proves that we have misinterpreted the divine to children."

While the importance of play as an educative factor in religion is fully admitted, we may perhaps question what seems to be the author's particular point of view. He seems in some passages to make the point that religious ideas may properly be quite constant elements in plays and sports. Thus he says that Christ should be made master of the playground. Let him not be conceived as 'a mere don't.' "He is come that children may have their own life and that they may have it abundantly. That means play with its fun, its noise, its contests. The more of Christ there is in play, the more fun there is, etc." (p. 148). Perhaps the author does not mean that religion shall be made such a *conscious* factor as these words seem to imply. In fact he says later that the normal way for children to advance in the law of love is to live out their selves in association with one another. All the contingencies of ordinary social child life have their place in this development. "To make Christ master of the playground, then, means such wise and subtle supervision of play as helps childhood impulses gradually to interpret themselves through their own expression into the Christian philosophy of life" (p. 150).

He rightly holds that religious education is more than the imparting to the child of symbols of religious realities, it is rather the growing up in the midst of these realities and the unconscious absorption of them, through life in a properly organized social community (p. 168). These social relationships with all their possibilities of fellowship, imitation, and suggestion are of prime importance in the development of the religious nature. A boy is loyal to country and family without knowing especially how he has become so. So virtue and all the higher religious ideas are learned. Religious education is thus not necessarily something 'dragged in' by sermonizing, if it is a natural growth in an environment organized on and exemplifying Christian principles (pp. 186, 190). The habits thus acquired furnish the basis of later conscious judgments of reflective morality and of religion generally.

The more strictly psychological aspects of the problem are discussed in the section of the book entitled 'The Child.' The author seeks here to make a 'detailed study of that within the child which religious education is called upon to develop, namely, the religious impulse.' The section contains a brief sketch of the psychology of childhood and an attempt to trace the development through childhood

and youth of this impulse, which is, he holds, 'native to the human mind' (p. 197). It is defined as that which leads 'toward the progressive unification of the man with himself, his fellows, nature, and all that is' (p. 201). It involves a realization of dependence and limitation, a projective element, or an element of aspiration which in time produces an ideal self and an ideal world which are spontaneously taken as the truly real.

It seems to the present writer that Professor Coe in his conception of the religious impulse is open to somewhat severe criticism. In the first place he posits a native religious impulse as a psychological fact and then seeks to give what is apparently a metaphysical account of the origin and development of this impulse. In the second place the whole discussion belongs rather to the philosophy of religion and is out of place in a book on religious education.

With reference to the theory of the religious impulse, he holds that in the infant consciousness there gradually develop the notions of self and of world as correlative ideas. Out of this relationship grows by degrees the conception of an ideal world, coördinate, of course, with the child's experience, and this eventually matures into a definite religious impulse. As a specific illustration, "The incompleteness of the parents' response to the questioning impulse permits the child mind to pass on toward the ideal of a being who can answer all questions" (p. 223). In other passages, however, the conception of the development of the religious impulse is less involved in semi-metaphysics and becomes somewhat psychological in form. Thus, "The very first impressions that the child gets of his world, his first glimmering sense of self, his earliest sense of need, all these begin to form his view of the world and his attitude toward life" (p. 206); and, "It is civilization that makes children civilized; it is the existing religion that makes children grow in religion" (p. 210). The author's position is evidently that each individual is originally endowed with a religious impulse, which owes its development, however, to the influences of the social group within which that individual finds himself (p. 211).

It is certainly not clear from the author's exposition, which is here only imperfectly represented, wherein there is ground that warrants the hypothesis of a religious impulse. If its development is to be explained in terms of the reaction of the psycho-physical organism upon the natural and social environment, why may not its *origin* be thus accounted for also? Will it be any less religious if it be found to be a construct from simpler elements? If, in other words, we say with the author, 'that which is natural comes first and then that which is

spiritual' (p. 206), we can see no necessity for going back to an elemental something that is religious. This seems the less necessary in the light of a further statement of Professor Coe's, that 'the religious principle is at work in all that goes to make up human experience.' If the whole process of development and growth is really one in which the divine seeks expression in the human, then human experience in all its phases is raw material for the construction of a religious attitude and the really vital question is as to what might be called the *mechanics* of the process of its construction.

The discussion of the parallelism of the religion of the child with that of the race is hardly more satisfactory. He recognizes that the theory of recapitulation in religion is quite limited in its application. In fact, to make the statement, "How far the child shall go in the process of recapitulation depends chiefly upon the kind of environment in which he is placed" (p. 214), is to admit that for all practical purposes the notion of 'the push from behind' is a myth. One strongly wishes that he had stuck consistently to these excellent statements in his treatment of childhood religion: "From the start, little by little, children assimilate the highest elements of their environment." "But the truth is that, if forcing and pressure be avoided, a child who is in contact with mature life develops with perfect naturalness while constantly absorbing elements of the higher culture;" excellent statement, we say, but only provided the implication of 'higher culture,' etc. is simply that the child is immature in the midst of a complicated social environment and that while he consequently often does quite crude things he rapidly adjusts himself, as a matter of fact, to the demands of the social whole in which he lives. His crudeness is solely the result of his immaturity and not of his savage ancestry, and he gets rid of it with astonishing rapidity if he chances to be in an environment of culture.

But the theory of recapitulation, though discredited, is not abandoned, but becomes an important means of throwing mysterious side-lights upon many simple facts of childhood and youth. Thus the hypothesis that primitive religion was animistic, non-ethical, and directed toward natural objects or ghosts (all of which points may be seriously questioned on the basis of recent anthropological science), is applied to the child's religion. Is it really true, as the author suggests (p. 218), that 'children are at first animists,' or that 'they interpret all nature by means of what they feel in themselves'? The illustrations adduced do not seem very clearly relevant. As is later admitted, many of these crude conceptions of children can be traced to the defective teaching they have received.

The last two chapters of this section, 'The Child,' devoted to the periods of development from infancy to maturity, are very satisfactory. The author here ceases to make any attempt to show traces of recapitulation and discusses in an entirely illuminating way the changing interests of childhood and youth with their significance for religious culture.

Part III. deals with religious education from the side of institutions, namely, the family, Sunday school, societies and clubs, academies and colleges. The treatment is both practical and suggestive and deserves separate notice. The book closes with two chapters on the perspective of religious education and a useful bibliography.

In a brief review it is out of the question to give any adequate account of the variety of topics treated by Professor Coe in his book, or the very great value and suggestiveness of the work as a whole. If one may be permitted, however, to pass on unsupported criticism, he might say that the usefulness of the book for those for whom it is written would have been greater if a less wide range of topics had been covered and if the material presented were better organized with reference to the main theme.

Religious Revivals and their Ethical Significance. J. G. JAMES.
Internat. Jour. of Ethics, 1906, XVI., 332-340.

The religious revival, interesting from many points of view, is of peculiar interest to the student of ethics. To what extent, by its appeal to the deeper psychic processes and by its tendency to bring large numbers of people into contact with some leader of commanding personality, does the revival become a positive factor in moral progress? At first thought it will seem, from the very nature of its appeal, that the revival must of necessity result in moral betterment. But it must not be forgotten that certain negative influences are set up through the large number who inevitably backslide, persons who thus become all but impervious, in the future, to all appeals toward better living. Still, it might be with justice maintained that it is of advantage that the moral ideal be at times impressed upon people, though it be imperfectly and with seemingly transient effects. The rise of moral and religious fervor in the revival and its apparent lapse afterward may indicate simply a necessary pulsation in morality as there is in all things that move. Is this a normal condition of moral progress or should it not tend to be steady and continuous? This question cannot be answered without taking into account the almost invariable connection of some great leader with times of moral progress. The fact of this connection

lends plausibility to the hypothesis that moral evolution is best measured by the advances scored by successive leaders. But however important the leaders may be, it is worthy of note that their appearance is usually preceded by a period of unusual stagnation in morals. This tends to make the outburst, when it comes, feverish and unhealthful. Realizing these facts, the moral leader should on the one hand endeavor to secure as much natural growth as possible, and, on the other, recognize that waves of moral fervor attain their greatest value if accompanied or preceded by a certain amount of healthful growth.

The great moral leader is to be regarded not as a product of forces existing before and in his time, but rather as an unexplainable variation, a sport, if we please, in the moral world as there are sports in the biological world. He is to be considered not strictly as a result of wider social movements, but rather as a coördinate factor along with general social processes in the movement toward higher levels of morality. He may even be more than this. The personal equation may be of the greatest importance in all ethical movements, the highest category in morals and in moral progress.

It appears, then, that while the revival may be productive of many psychical excesses, and while it may tend to place an undue stress upon the occasional upheaval and not enough upon continuity of growth, it really is a factor in moral progress in that it utilizes a rhythm which in some degree or other is inevitable and is an avenue through which a person of superior moral insight may impress himself upon the masses.

The Psychology of Sudden Conversion. MORTON PRINCE. Jour. of Abnormal Psychol., 1906, I., 42-54.

The author criticizes Professor William James' view that sudden conversions are to be accounted for by a somewhat extended period of incubation of motives in the subconscious region. The theory may account for some cases, but it is certainly not true generally. Granted that sudden conversion is a normal phenomenon, 'it has not yet been demonstrated that in *normal* life there is any active subconscious field sufficiently large to develop the ideas which have been noted.' Moreover, the theory has not been demonstrated by experiment and even James admits that there are cases in which the subconstious incubation seems quite unlikely.

The author then presents a case (reported more fully in *The Dissociation of a Personality*), which closely resembles the Ratisbonne case discussed by Professor James. In each case the individual, after a period of extreme depression, experienced a sudden illumination or

state of ecstasy. The change in Dr. Prince's patient was not of a religious nature but was in every other way identical with this type of religious conversion. She was found in a high state of mental exhilaration. After a period of great depression all had changed without her knowing how or why. There was a gap in her knowledge between the end of the depressed state and the beginning of the exalted state. This gap was filled by the accounts given by two or more secondary systems excited by hypnosis. It was thus brought out that while she 'was communing with herself, her eyes became fixed upon one of the shining brass lamps of the church,' whereupon she went into a trance-like state in which her consciousness was made up of many disconnected memories, each of which was accompanied by emotion. These emotions were in general of well-being, peacefulness, or exaltation. When she awoke the memories of the trance state were forgotten but the emotions persisted. "They were of lightness of body, of physical restfulness, and well-being, besides those of exaltation, joyousness, and peace, largely of a religious nature." When she regained her logical ideas, which were of a religious nature, the emotions present were associated with them although they had originated in connection with quite a different thought setting, now of course forgotten. This led her to regard her sudden change in condition as due to a miraculous visitation. "In this case, then, there was no incubation or flowering of subconscious ideas deposited by the experiences of life through a period of time; there were simply emotions of the moment which had developed in a trance state, which persisted after coming out of the crisis as a state of exaltation, and which, of themselves, through their naturally associated ideas, suggested the beliefs which took possession of her mind. These emotions were reënforced by those belonging to a series of subconscious ideas which were a sort of subconscious continuation of the trance dreams."

In general, Dr. Prince believes that in most cases of sudden conversion, "at this crucial moment the subject, perhaps half oblivious of his surroundings, sees visions which are apt to be the expression of his doubts, and hears a voice which speaks his own thoughts. On coming out of this hysteroid, or hypnoid, state, the exalting emotions persist, along with an incomplete or possibly complete memory of all that has taken place. These emotions then give an entirely new shape and trend to the individual ideas, just as the distressing emotions following hysterical accidents determine the form of the mental content."

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BELIEF.

The Relation between the Act and the Object of Belief. WALTER B. PITKIN. J. of Philos., Psychol. & Sci. Methods, 1906, III., 505-511.

By way of introduction the writer calls attention to the fact that the word 'belief' has two possible meanings, 'the thing believed in' and the belief attitude. Consequently the question of the reality of beliefs may take three forms: (1) Is the object exactly as we believe it to be? (2) Is the belief attitude real? (3) Is there any real connection between believing and the object of belief? The last problem is the one considered.

It is said that nitrous oxide can induce the belief attitude, while belief is ordinarily supposed to be based on reflection. Can these apparently opposed positions be harmonized? The problem is this, Does not the act of belief always give us assurance of something? Belief as a mere 'useful occupation' does not satisfy the metaphysician. "It is only by showing that the act of believing either expresses or implies something about reality that we can come to trust the act itself." The belief-act, therefore, contains a transcendent element, implying a certain independence of the act and the object of belief. This is true in a temporal sense. I believe to-day that a certain event took place yesterday. For the metaphysician every belief-object has a reality. The existence of hallucinations does not militate against this position, since the belief objects in this case exist, though ordinarily misinterpreted. This is not saying that the belief-object exists apart from one's consciousness-system as a whole. The question of truth is that of a proper distinction between reals. Chronic hallucinations, where the object represented does not entirely disappear in spite of disbelief in its external reality, prove the independence of the belief-object.

Consequently, whether the belief attitude be induced by nitrous oxide or by convincing logic, in neither case are we compelled to admit that the objects believed in depend for their existence on the activity of believing.

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FEELING AND EMOTION.

Organic Changes and Feeling. JOHN F. SHEPARD. Am. Jour. of Psy., 1906, XVII., 522-584.

The chief concern of this paper is an examination of certain forms of possible organic reactions accompanying various mental processes,

with special reference to Wundt's tridimensional theory. Some slight essay is made, besides, to determine the character and nature of P-UP, E-D, S-R in accordance, it would seem, with the conception of feeling as unanalyzed sensation.

After a concise review of the literature up to date the experiments follow thus:

I. *Peripheral Volume Changes*: The instruments used were a plethysmograph, with a delicate piston recorder, described by Lombard and Pillsbury in the *American Journal of Physiology*, Vol. VIII., and a Sumner pneumograph.

Six trained introspectionists were tested with a wide range of stimuli (sounds, odors, problems, etc.) and in every case asked to classify their mental reactions in terms of S-R, E-D and P-UP. From these the paper quotes extensively.

II. *Volume of the Brain and of the Periphery*: A laborer of average intelligence, who had had a piece of the skull 8×6 cm. removed on the right side near the Rolandic region, served as subject. Here, too, introspections were recorded and many stimuli were used.

III. *The Rate of the Heart and Breathing*: Dr. Shepard's method of counting the pulse deserves consideration. He measured each pulse beat of a given wave in terms of a $\frac{1}{100}$ second unit and plotted them in a curve. His curves reveal frequent shorter temporary reactions whose character could not have been seen by a rougher method. They show, too, that the larger general changes are uncertain if studied less accurately. "There are large variations from purely physiological causes . . . and the kind of results one seems to get by any method of averages [such as counting the number of pulses in each 10 seconds] depends far too much on where in one of these curves one begins his count."

The results are based on an interpretation of 150 curves from Experiment I., 150 from Experiment II., and 110 from Experiment III. No curve was used whose corresponding introspection could not be classified as P or UP, S or R, E or D. How many records were rejected in Experiments II. and III. is not stated. Three hundred were held to be unsatisfactory in I., not only because of poor introspection, but often because *there was no reaction*. This absence of reaction was not due to temporary insensitivity or discrepancies in the apparatus. Is it not, therefore, sufficiently interesting to demand an enumeration of the instances of it, at least? Were there, for example, 150 curves in Experiment I. with good introspections, but no appreciable organic reaction?

Dr. Shepard's interpretation of the introspective results of I., II., and III. seems to point to a theory in part like that of Wundt. On the basis of vasomotor and heart-rate changes, on the other hand, he is convinced that neither a dual nor a tri-dimensional classification is possible. He attempts no correlation of these two.

Introspection evidences that P-UP, E-D, S-R exist, P-UP only, however, are unanalyzable and felt to be opposites. "S-R, E-D when analysed *lose their character as feeling* and are resolved into organic, particularly muscular, sensations." Thus analysed there is no sharp line of demarcation between S and E. Strain seems to be a teleological whole in which every element connects with all the others. "Excitement, on the other hand, is characterized by a half fusion of the different lines of association." Moreover, R is hardly the opposite of S or E as P is of UP. It is rather a secondary state due to the returning from the sensations one gets from the active muscles of S or E, to those of the lax muscles, in release from S or E, and partakes of them both. So, the consciousness of R differs according as it follows S or E and contains the afterglow, now of one, and again of the other. Nor is depression-rest the opposite of S or E; it is simply different. "It obtains its sensory content from the quiet muscles or those acting easily, . . . we can have it simultaneously with neither S nor E, except when felt as oppression, and continued S as well as continued E gives rise to D."

Between the physiological accompaniments of P-UP, S-R, E-D there is no reverse relation, not even between P-UP: much less are there three such pairs of reactions. "In short, all moderate nervous activity tends to constrict the peripheral vessels and to increase the size of pulse in the brain. All moderate nervous activity likewise increases the heart rate. Strong stimuli cause both an exciting and inhibiting effect, which is seen especially in the heart rate. They also cause a double reaction in the brain. The most marked effects are at the changing periods, particularly with an incoming stimulus. Lastly, the activity of any part, or the prominence of sensations from it tends to counteract constriction in that part" (p. 558).

The paper, as a whole, is admirable. It closes with a suggestion or two in explanation of the reactions obtained.

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Wundt's Doctrine of Psychical Analysis and the Psychical Elements, and Some Recent Criticism. I. *The Criteria of the Elements and Attributes*; II. *Feeling and Feeling Analysis.* EDMUND H. HOLLANDS. Am. Journ. of Psych., XVI., 499-518; XVII., 206-226.

The general motive for these papers is to be found in certain criticisms of Wundt's doctrine of feeling expressed in two recent articles by Dr. Washburn. These, according to H., are as follows: (1) It is not clear whether Wundt's criterion of analysis, independent *variability*, includes independent *existence*. If it does, feelings are not elements; if it does not, what would justify his refusal to make attributes themselves elements? (2) His criterion for the attributes, independence of the mental context, is insufficient to rule out clearness as an attribute. (3) His distinction between feelings as subjective and sensations as objective is epistemological and extra-psychological. (4) His reference of the unity of feeling to that of apperception, and his consequent definition of the simple feeling, make it impossible to distinguish between simple and complex feelings, save by reference to their sensational substrate. H. proposes "by an examination of the various passages bearing directly upon the subject in all of Wundt's published writings, to determine his present theory of analysis and the psychical elements, and the various changes through which it has passed; . . . in the second place, and by aid of the clearer light which may thus be thrown upon the matter, . . . attempt to decide whether, and how far, Dr. Washburn's criticisms are justified."

In tracing the evolution of these problems, H. succeeds in defining four periods: I. Characterized by the fact that feeling is not yet treated as an element (1862-83). II. Characterized as studies of method (1883-89). III. Characterized by the treatment of feeling as an independent element, but with two directions only: pleasantness — unpleasantness (1889-96). IV. Characterized by the culmination of Wundt's doctrine of feeling in the feeling manifold (1896-1902).

Considering Dr. Washburn's points of criticism in the light of H.'s exegesis, we find that (1) is met even in the writings of the first period which treat the element as being marked off by its *separability*. As to independent existence, the second edition of the *Logik*, which falls in the third period, makes it a criterion for sensation but not for feeling. Feelings, it is true, are not independent in the same way that sensations are, but it is a dogmatic prejudice which declares that all subjectively unanalysable constituents of consciousness must be possible isolated objects of attention. As to the distinction between elements and attri-

butes, the element, while no breach can be made in it, can be experienced in different mental contexts. Attributes cannot be so separated and experienced.

(2) The attributes have four criteria, instead of one merely, as mentioned by Dr. Washburn. These, too, appear in writings of the first period, and are as follows: (a) The element is structurally distinguished by the attributes quality and intensity. (b) Every sensation has these, and they are inseparable from it and from each other. (c) These attributes attach to the element itself, and do not depend upon its relation to the context of which it forms a part. (d) As distinguished from each other, however, they are independently variable and can therefore be attended to separately. Clearness as an attribute, it will be noted, is ruled out by criteria (b) and (c).

(3) In the *Beiträge zur Theorie der Sinneswahrnehmung* (1862) and in the *Vorlesungen über die Menschen- und Thierseele* (1863), pure sensation is considered to be the original element, while a distinction, partly epistemological, is made between feeling and sensation in the stricter sense. The perceptual process is conceived as a series of unconscious judgments or inferences, as a result of which subjective and objective moments in the pure sensation are distinguished as feelings and sensations respectively. This epistemological distinction is expressly given up in the first edition of the *Grundzüge* (1874), also in the first period. The distinction of subjective and objective as two phases of conscious experience is, however, retained throughout Wundt's writings, although it is not until the fourth period that we find a strictly psychological meaning for it. This we do in the first edition of the *Grundriss der Psychologie* (1896). Here sensations and feelings are differentiated in accordance with three specific criteria: (a) The qualities of sensation move between maximal differences, whereas those of feeling move between maximal opposites. (b) Simple feelings are declared to be much more numerous and various than simple sensations, and are considered as subjective complements, not only of sensations, but also of ideas and ideational complexes. (c) Sensations fall into disparate systems, while feelings form one connected manifold. Here in (c) the origin of the subjective nature of feelings is explained psychologically as consisting in this unity, this connectedness in a single continuum.

(4) In writings of the third period, first in the *Logik*, second edition (1895), we note that, although the criteria of separability and non-decomposability are maintained as fundamental for determining an element, still the method of analysis for feelings differs from that

employed in analyzing sensations. Feelings may be analyzed by considering the sensational substrate as the feeling stimulus, and varying it experimentally to test the relative simplicity or complexity of the feeling thereto attached. However, we learn from writings of the four periods, in particular the successive editions of the *Grundriss*, that mere reference to the sensational substrate is not sufficient to determine the character of the feeling. It may happen that independent variation in the components of a sensation, as, for instance, brightness, saturation, color tone, might alter the feeling and thus make it appear complex.

The author has carried out his investigation in a painstaking and, it would appear, accurate manner. It does seem, however, that in a work of this character, a clearer and more comprehensive tabulation of results might have been formulated for the purpose not only of lightening the reader's efforts, but also of making the work more readily accessible in matters of reference.

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Abhängigkeit der Atem- und Pulsveränderung vom Reiz und vom Gefühl. M. KELCHNER. Arch. f. ges. Psychol., V., 1-124.

This is one of the most interesting of the recent articles on organic reactions. Its especial value is in the careful study of the breathing changes. Curves were recorded from both chest and abdomen. As in nearly all investigations of the kind, the method of determining the heart rate is not sufficiently accurate.

The writer gives a thorough criticism of Lehmann's work and passes to the experiments on agreeable and disagreeable states caused by taste, visual, and auditory stimuli. Agreeable tastes were accompanied by a quickened pulse, agreeable tones and colors by a slowed pulse. The quickening of the pulse with taste stimuli varied inversely with the agreeableness of the experience, so that longer pulse seemed to be here the natural expression of agreeableness. The pulse increased in rate generally with disagreeable states.

The breathing changes in both agreeable and disagreeable showed great individual differences. Pulse and breathing are, to a certain extent, independent variables, and there is a great difference in the significance of the two as expressions of the feelings. The individual differences are found in depth and rate changes as well as in the relative part of the chest and abdominal factors, so that it is always necessary to consider both breathing curves.

Strain was studied mainly by announcing a reaction of some sort which should take place at a second signal. Quickening of the pulse was the result. The breathing showed great individual differences. Relaxation gave the reverse of the expression of strain, and this was true even in the individual differences. If strain preceded and turned to relaxation at an agreeable or a disagreeable process, the relaxation simply displaced the other feeling reactions, and the result was indifferent to the nature or degree of the agreeableness or disagreeableness.

Cutaneous pain gave rather uneven results. There was a tendency toward faster breathing. The pulse was quickened except with one subject. A faster pulse and an irregular, generally somewhat quickened breathing accompanied fright. There was a slowing of the pulse afterward. This seems to correspond to the feeling of relaxation which may follow fear.

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La Haine. Étude psychologique. E. TARDIEU. Rev. philos., LX., 624-635. December, 1905.

L'Ironie. Étude psychologique. GEORGES PALANTE. Ibid., LXI., 147-163. February, 1906.

Les conditions biologiques du Remords. G. DUMAS. Ibid., LXII., 337-358. October, 1906.

In the psychology of the affective life the study of particular emotions and emotionally qualified dispositions in detail seems to be the order of the day. The three articles here noticed are among a relatively large number of the sort that have recently appeared and, if not typical, may nevertheless serve to suggest the kind. The first two are mainly descriptive, the third physiological; all end in a judgment of value. Each in its way is characteristically modern, but the descriptive articles, at any rate, cannot on that account claim superiority over older models.

Hate, according to M. Tardieu, is an expression of the instinct of self-preservation in persons excessively emotional and egoistic. Some hatreds are transitory and disinterested, but many are congenital. The temperamental hater hates everything. Various conditions of hate are pointed out and various forms and occasions of its manifestation. Finally, as to its value, it is said that while it is not to be recommended, yet it is at times a stimulus to talent (writing, eloquence), and, since one can't love everybody, hatred of foreigners is an excellent preparation for the future when self-preservation will oblige us, in the interest of pride and victory, to strike a blow at our enemies!

The conception of irony has passed through various changes since Aristophanes (*Nub.*, 229) first used 'ironical man' to denote a clever, foxy character, like Socrates. In Plato, too, 'irony' and 'ironical' are used only in a bad sense. Aristotle defined the 'ironical man' as one who depreciates himself by disclaiming or underestimating his real worth, as, for instance, Socrates (*Eth. Nic.*, IV., 7). This finer meaning was lost sight of, however, by Theophrastus, who pictures the ironical man as 'one who takes a cynical pleasure in misleading or inconveniencing others by the concealment of his real feelings and intentions' (Jebb). In modern times irony is loosely applied as a synonym of sarcasm to a mode of speech that conveys an idea the opposite of that which is literally expressed. M. Palante, without defining it, treats it as essentially an attitude of thought and sentiment. His views are as follows: The general psychological conditions of irony are a dualism of thought and intuition, of thought and action, of intelligence and sensibility, or, again, a conflict of instincts in sensibility itself. Its metaphysical principle is pessimism, which in its social aspect is nihilism. It differs from cynicism in that the cynic takes himself at least seriously, whereas the ironical man takes himself no more seriously than the rest. Yet irony may have in it an element of tragic seriousness. Philosophically, it is the direct opposite of rationalism, which looks to the ultimate triumph of reason in the world, and differs from the attitude of criticism, which is a variety of rationalism. There are various kinds of irony—intellectual and emotional, spontaneous and reflective. There is also a kind of irony which is not irony proper, but cynicism, irony as a method of life. In conclusion the author expresses the opinion that irony has to-day a useful function in preserving open-mindedness as against social and moral dogmatism.

M. Palante's study interestingly describes certain recognizable moods and attitudes that may perhaps be called irony, but it appears to allow no place to playful irony nor to the characteristic irony of Socrates, who, one would suppose, must after all furnish the point of departure for any discussion of the subject, and who was certainly no pessimist.

M. Dumas seeks to show by pathological evidence that the feeling of remorse depends not only on logical conditions, such as a comparison of conduct with ideas of good and bad, but also, and more particularly, on affective and physiological conditions. Six cases are used in illustration and four of them treated in detail. In a case of 'passive' melancholia it required considerable effort to rouse any real

feeling of remorse at all; the hypodermic injection of a gram of caffeine modified the severity with which the patient judged her conduct; in her state of exuberation—she belonged to the ‘circular’ type—she excused and justified it. In two cases of ‘active’ melancholia the symptoms of mental and physical depression were combined with manifestations of acute suffering, but the remorse was suppressed in both cases by the application of stimulants. In a case of morbid scruple the most efficacious means of combatting the feeling were found to be such physical appliances as a bath, exercise and the injection of caffeine. The principal conditions of remorse in pathological cases are, in the author’s opinion, first, a state of depression with the instincts and desires that caused the fault in abeyance, and second, either (*a*) a feeling of distress evoking painful memories, or (*b*) a disturbed feeling of diminished vitality causing the subject to dwell on fixed ideas which define and accentuate the emotional distress. In both cases the remorse is an expression of the disturbing, unresigned depression. The conditions in ‘normal’ persons are similar; in fact, persons who suffer remorse are never quite normal, but tend either to pathological scrupulosity or to anxious melancholy. The author illustrates this by two examples. Nor are such persons peculiarly moral. On the contrary, the healthy moral attitude is not remorse, but repentance and reparation.

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Crying. ALVIN BORGQUIST. *Am. J. of Psychol.*, 1906, XVII., 149–206.

The author bases his study upon the replies to 200 questionnaires sent out by President Hall. He divides the subject into three parts: (1) The more general aspects of crying, physical causes, influence of age, and description of mental states. (2) An analysis of the act of crying as a series of physical events, such as attitudes of body, sobs, lump in the throat. (3) A general review of the present theories of crying.

As shown by the questionnaire, crying appears to be a reaction from many apparently different states, such as anger, grief and joy, which may be taken as the most general divisions. These three divisions also prove to be widespread and, so far as can be determined from the data furnished, universal among all races.

Age seems to produce diverse effects upon crying. The cry of the child is sharp and usually expresses a bodily need or desire. He cries more from anger or pain, while the cry of the adult is from grief.

The child's cry is one of helplessness; that of the adult one of hopelessness.

Crying is the crisis of a period of strained effort. Energy is at a low stage, activity is stagnant. The will gives up and the interruption relieves the strained condition.

Having dealt with the reasons why we cry, the author considers the question of why we cry just as we do. Crying, both as observed by those who answered the questionnaire and viewed as a physiological process, is a very complex phenomenon. It is difficult to define or explain, yet it presents itself in a more or less uniform series of acts with decided changes due to age or other conditions.

The essential elements of crying are: changes in the circulation, lump in the throat, vocalization, sobs and tears. The attitude of the body also differs with the cause of the cry; the typical attitude of the grief cry is one of collapse. Vocalization in the cry is found among the first acts. It is found more among primitive people than among civilized. In the cry of hunger, fear or anger the cry is clearly a call for help, and it is in fulfilling its function as such that language has, in part at least, developed. The lump in the throat is a mysterious element. It seems to precede the tears and to come close to the sobs.

Generally the sob comes later in the cry and remains after other symptoms are suppressed. It is usually a part of adult grief, and is generally looked upon as a climax of the crying spell. Except in a few instances tears are absent during the first weeks of life. It is this element of the cry that is least under the control of the will. Tears are essentially a part of the grief cry, and not of the cries of anger, fear or hunger of the child.

Both in medical opinion and in the opinion of many other observers, crying comes as a mental relief principally, for the physical effect is one of exhaustion. It occurs under many different mental and physical conditions, but its principal element seems to be a shading from a feeling of helplessness in the child to a feeling of hopelessness and surrender of the will in the adult. Crying, in the last analysis, is a situation in which a reaction has taken place after a period of strained effort and depleted energy. Analyzed into its various physiological parts, the crying act presents two groups of symptoms: (1) the active movements of calls, as represented in the vocalization of the infant, and (2) the facial expressions, the sob, the lump and tears, all of which are connected closely with the vagus and other cranial nerves, and also very closely connected with the digestive apparatus and are thus interpreted as rejection movements, going back to the primitive form of rejecting food.

To quote directly from the author, these movements are, according to this interpretation, a primitive form of expression on the physical side of the mental state of displeasure. The mental and physical acts having never been dissociated from each other, the suggestion is made that, in more subdued form, some such actions occur as the correlate of all states of displeasure. The particular form of expression of helplessness by the cry has been preserved, together with its subjective correlate, pity, as a fundamental psycho-social situation.

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L'explication physiologique de l'émotion. G. R. D'ALLONNES. J. de Psychol. Norm. et Pathol., 1906, III., 14-25, 132-157.

This article consists of a description of some experiments of Bechterew and Sherrington which bear upon the theory of emotions, and their interpretation upon the basis of the visceral theory of the author. Bechterew removed the cortex of dogs and cats, and found that, as long as the optic thalami remained intact, the animals were capable of all the movements expressive of an emotion. Bad treatment produced such manifestations of anger as grinding the teeth, bristling of the hair, and the erection of the ears, while caresses produced wagging of the tail and, in the case of the cat, purring. Previous experiments by Charles Bell and Stromeyer had already shown that, when the cortex is intact and the optic thalami removed, such reactions are impossible. The experiments of Bechterew show, therefore, that in the absence of intelligence and subjective affectivity the physiological and mimical manifestations continue to be produced by external and internal excitations.

The experiments of Sherrington were made upon five young dogs after section of the spinal cord in the inferior cervical region and, in two of the animals, of the vagosympathetics of both sides. Thus, while the connection between the spinal cord and the sympathetic system was uninjured, all connection between the brain and the thoracic and abdominal viscera was destroyed, as well as that between the bulbar vaso-motor center and all the blood vessels, except a few supplied by the cranial nerves. The skin and motor organs, including the muscles of the shoulder, were likewise deprived of all communication with the brain. The head, the diaphragm, and the front part of the anterior members (*i. e.*, the principal organs of expression) are the only parts which remained sensitive. But, in spite of the exclusion of nearly the totality of the body, the reactions from this uninjured territory — play of the physiognomy, diaphragmatic voice, movements

(still possible) by the flexors of the neck — continued to be produced as if the subjective emotion existed. Sherrington concludes that the subjective emotions were actually present.

This conclusion of Sherrington is incompatible with the conclusions drawn by M. d'Allonnes from a patient suffering with loss of the emotions, which loss was apparently due to a complete visceral anæsthesia. One may ask, therefore, says M. d'Allonnes, if the dogs of Sherrington do not merely place us in presence of the mimical reactions, coördinated but unemotional, which Bechterew has studied, with this complication, however, that the brain, deprived of the afferent data without which the emotion is not produced (sensations from the viscera), continues nevertheless to influence the mimical mechanism. The unemotional patient of M. d'Allonnes showed all the outward signs of an emotion at the very moment that she complained of feeling no emotion. He claims that, similarly, it is probable that the dogs of Sherrington no longer felt an affective shock, properly so called, but that their habits, their mental images, and their perceptions continued to produce a conduct intelligently, but mechanically, adapted to circumstances, in the absence of affective sentiments.

HERBERT WOODROW.

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The Feeling of Unreality. FREDERICK H. PACKARD. J. of Abnorm. Psychol., 1906, I., 69-82.

The writer follows Wernicke in the three-fold classification of 'the feeling of unreality' based on the relation of consciousness to the outer world, to one's body, and to one's mental self. Various theories in regard to the disorder are noted. The evidence at command seems to show that this feeling is not due to disorders of the cutaneous, muscular, or visceral sensations.

The patient whose case is discussed in this article suffered from several attacks of depression, the last of which was marked by a strong feeling of unreality. Some of her expressions were: 'Things about are like dreams'; 'I see the trees and yet I don't see them; they don't seem real and yet I know that they must be because they are the trees that I always saw'; 'It is as if I were dumb, I can't sense things.' The special senses and memory were unimpaired, and the sense of pain only at times diminished. Experiments proved that the apperceptive activities were complete but carried on with considerable difficulty. Easy stories acquired meaning only through a laborious process of visualizing the objects referred to.

The writer's hypothesis is that 'the feeling of unreality is due to a disorder of apperception, which in turn is due to an association difficulty.'

Since the same depression and retarded associations were present in other patients without the feeling of unreality, is it not probable that the feeling of unfamiliarity present in this case may have been the cause of the feeling of unreality? 'I remember with my head but not with my feelings,' would indicate that the process of association was complete, but that the feeling of familiarity ordinarily attending the recall of previous impressions was lacking.

C. B. McMULLEN.

PRINCETON UNIVERSITY.

ATTENTION AND INTEREST.

Physiologie et psychologie de l'attention. JEAN PAUL NAYRAC.

Préface de TH. RIBOT. Paris, F. Alcan, 1906. Pp. xi+212.

The author defines attention, together with effort and will, for these states or activities are indistinguishable one from another, as our 'faculty of mental adaptation.' 'All other mental, and all organic functions are in coöperation with it. He devotes sixty pages to a review of the physiological phenomena that are peculiar to states of attention. Acceleration of heart beat and respiration in brief attention, plethysmographic determinations, cerebral vaso-dilation and peripheral constriction, chemical combustion and hyperglobulæ, physical fatigue after attention, nerve tonics and their effects, the oscillations of attention, which this state or activity presupposes—these are some of the topics which are reviewed. The author in many cases reports the conflicting results and opinions of experimenters. Thus he creates the impression that his review is thorough and makes this section of his volume of great value to the physiological psychologist. From this review he draws the conclusion that attention is of central origin; that peripheral phenomena are parallel to it but are in no sense conditioned by it, nor, on the other hand, do the latter produce attention. It is a general condition of nervous activity from the physiological viewpoint. Pathology confirms all this, for mental dissolution is reflected throughout the organism in the systematic disappearance of those peripheral phenomena which are observed in states of attention. The physiological evidence suggests the fundamentally instinctive nature of attention.

The order of mental dissolution — and hence of degeneration of attention, since all mental powers are wrapped up in it — is from complex to simple. The low-grade idiot and the mystic in ecstasy, both

at the bottom of the scale, are alike incapable of attention, properly speaking. The simplest, most ancestral instincts are still strong. They resist pathological processes for a long time.

This gives the cue to the reëducation of attention, a subject to which the author devotes several pages. He has made no contribution to present knowledge of the matter. The general rule — ‘from simple to complex’ — is applied by all those who undertake the reëducation of the aphasic or any other type of paralytic.

In the education of attention in the first instance let the motor factor be prominent. A knowledge of manual work, and especially of the language of deaf mutes, should be required because they afford such a varied motor expression of mental activity. A thought, expressed motorially, is not readily forgotten. M. Biervliet, in his *Education de la mémoire*, has shown that the motor is the most precise form of memory.

In both school and home, which are the social factors in the education of attention, the conditions should be as nearly as possible like those of actual life. The over-indulgent teacher and parent are a hindrance to the realization of this ideal. Under them the child does not develop and thoroughly fix increasingly complex habitual reactions and the habit of prolonged voluntary attention, even to disagreeable problems, for the sake of a remote advantage. But it is only by fixing these complex reactions which are uppermost in the mental hierarchy that a strong barrier, difficult of penetration, if not impassable, can be erected against that dissolution of attention, and hence of the whole mental fabric, which usually accompanies disease and old age.

What the author says of the education of attention suggests, though he does not discuss, the proposition that the doctrine of interest, faultless as it is when perfectly understood and applied, is, by many at least, sadly abused. Many young teachers and teachers-to-be, after reading some of our popular pedagogical literature for normal schools, infer that such and such topics should be taught, and according to a particular method, because these are the topics ‘that are interesting to children,’ and this is the ‘way that makes them more interesting.’ The teacher descends into ‘soft pedagogics,’ and many a one remains there. Far from making her institution a ‘school of life’ she makes it one of smooth indulgence. Time is wasted in a foolish attempt to make necessarily uninteresting subjects interesting. The pupil’s effort is reduced to a minimum and his increasingly complex reactions, therefore, are not firmly fixed into habits. Perseverance under disagreeable circumstances becomes a foreign virtue.

Would it not be wise for the teachers to take for their motto: "More learning and less teaching!" Surround the lesson with enough interest to release the pupil's effort and let it be as severe as he can safely endure. Thus the best in the doctrine of interest is observed and the work habit in our pupils is well-nigh assured.

ROBERT H. GAULT.

WASHINGTON COLLEGE (MD.).

The Relation of Feeling and Interest. LUCINDA PEARL BOGGS.
Jour. of Phil., Psych. and Sci. Meth., 1906, VIII., 462-466.

Before treating of the relation between feeling and interest, Miss Boggs proceeds to find exactly what are the characteristics of feeling as distinguished from emotion and cognition. Emotions are more complex phenomena, consisting of 'organic sensations, idea complexes and the simple affective elements which are sometimes called affection, simple feeling or feeling tone' (p. 462). Feeling on the other hand is irreducible. It leads to the expressions, 'I feel I ought to do this, I feel it a pleasure, I feel it a real concern, etc.' (p. 462). As regards cognition, there is a more definite external localization, a certain objective reference present which is lacking in feeling.

In feeling there are present vague, subjective, incommunicable states. When interest is present, these vague states become objective, definite, communicable to others than ourselves. Interest thus is an in-between state tending to bring about an alternation of vague feeling states and distinct cognitive states. Feeling and interest are not identical. "A feeling may develop into an interest, since the idea which is to lead in the quest for a chain of reasoning and its conclusion may arise from the vague sort of consciousness above described" (p. 465).

Following Wundt's theory of feeling we may pair the following:

Involuntary attention.....	Pleasantness.
Vacuity or distraction	Unpleasantness.
Interest	Excitation.
Indifference.....	Repose.
Voluntary attention.....	Strain.
Inattention	Relaxation.

Interest is without the organic changes present in emotion, and seems to be closely connected with a feeling of excitement.

FELIX ARNOLD.

NEW YORK CITY.

PERSONALITY.

The Personal and the Individual. ARTHUR ERNEST DAVIES.
Journ. of Philos., Psychol. and Sci. Methods, 1906, III., 401-409.
Mr. Davies makes a distinction between these terms, person and

individual, that seems sufficiently clear and fundamental to remove the further consideration of the difference between them from the realm of 'esthetic annoyance' to that of 'intellectual problems.' The distinction lies in the field that Mr. Davies calls 'social psychology.'

In a social group we find both structure (*i. e.*, organization expressed in a constitution) and life (*i. e.*, the development of the conscious life of its members considered collectively). The term personal is more closely related to the former, the conservative, mechanical and statistical aspect of the group; for, "to be a person means that the larger life, the common shared life of the group, comes to a particular expression in each of its members in such a way that the originality of the expression does not subvert, but conserves, the fundamental and primary meaning of the constitution which confers the rights and sets the limits of personal activity. Personality, we see, then, is a distinctly social quality."

Individuality, on the other hand, is related rather to the development, the life of the group, for it 'consists in those unique qualities, or unique combination, of common qualities, by which one man is distinguished from another in the same social group.' 'The subject as individual is reacting . . . so as to emphasize differences, not . . . to maintain similarities. But the differences . . . fall within the group, which . . . conditions from start to finish the life that human beings are necessitated to live.' In this sense we speak of 'strong individuality.' Personality is typical, and social. Individuality is atypical, but the variation and tendency to separate from the group is really essential to the life of the group. Individuality therefore involves personality and is the more highly developed character. Both individuality and personality illustrate, 'although with a different emphasis,' the same general fact that the members of the group must express the group type each in a different way.

Mr. Davies, after reminding us that personality of itself would constantly tend to the habituation of actions and thus to unconsciousness, points out that from such a result the escape lies either in moving from one group to another, the course of the weak individual, — or in awakening to the *ideal* which every social group implies, the course in which individuality is shown. This part of the argument is incomplete in that it does not show how this power to see the ideal is related to mere variation, in which the essence of individuality is said to consist.

Discussion of imitation, while not essential to the argument, is important, for it is largely in accord with Baldwin's theory of 'circular

reaction,' and puts in a rather striking way what seem to be some implications of that theory. We never imitate anyone but ourselves, says Mr. Davies, for to imitate is to reproduce a state or condition of one's own feeling life; the causation of imitation lies in the life of feeling. From this it would seem that unconscious imitation is a misuse of terms, and that infectious laughing or yawning, where the stimulus is so different from the subject's sense of his own response, is not imitation. Again, Mr. Davies says that imitation functions primarily for the enjoyment of the act, and while it operates for the sake of the adjustments mediated by it, yet that is a secondary consideration. This statement leaves it doubtful whether 'the causation of imitation' which 'lies in the life of feeling' lies in the feeling of the action to be reproduced, or in the feeling that the action will indeed be a reproduction. The former on the whole seems to be Mr. Davies' position, and it leads, as I understand it, to an identification of imitation with volition, *i. e.*, with any realization in movement of an idea of that movement!

PERCY HUGHES.

TULANE UNIVERSITY.

Ethics, Sociology, and Personality. J. A. LEIGHTON. *Philosophical Review*, 1906, XV., 494-510.

A most interesting presentation of ethical standpoint is given by Professor Leighton in this article. His cry for a study of actual conditions reminds one of Herbert Spencer's demand for actual practice on week-day of our Sunday theory.

"We must start," says Professor Leighton, "from our own ethical experience, however confused and inconsistent it may seem, and whatever course of investigation we may pursue, its final term must be our own reinterpreted and clarified judgments" (p. 495). Confusion exists in modern ethical judgment because of the attempt to judge new situations from traditional standpoints. Properly to study ethical values, historical orientation becomes necessary. "The great bulk of generally recognized ethical judgments and commonly accepted maxims of conduct has a social reference and their history is interwoven with the history of society" (p. 496). This historical reference shows the evolutionary character of many of our ethical interpretations. Sociology affords us a method of approach, but we must go still further in the study of ethics. The individual becomes an originating center of judgment and action, "and for ethics the reflective individual, capable of independent insight, . . . should be the center of primary consideration and ultimate reference. . . . It is a sociological problem as to how institutional morality is evolved and maintained. It is, *par*

excellence, an ethical problem as to how in a changing or relatively stable social structure, as the case may be, the individual may realize and express *personal values*" (p. 499).

From this standpoint, Professor Leighton shows clearly the three distinct levels of moral activity in the history of the race and of the individual. "First is the purely reflex or unconscious social or tribal morality of unreflecting selves who are simply passive organs of the 'tribal self.'" Tradition and custom here rule. "The second principal level of morality is that in which the individual consciously and reflectively identifies his own interests and standards of action with those of society. At this level the self becomes aware of the rationality of social or institutional morals" (p. 499). At the third or highest level the self becomes transcendent and places the sanction of action within himself. To use the words of Professor Leighton, we have a distinction 'between the social as *given* and as *ideal*, between the moral life as *gegeben* and as *aufgegeben*.'

By making the study of ethics swing round the rational self, one need not be entirely individualistic, however. We find within such individualism a certain social reference of average kind. "Not only do individuals possess a common reason, but, through their very individualities, they embody in diverse proportions and relations common tendencies of feeling and action. In matters of justice, truth telling, self-control, there is a general tendency common to civilized men" (p. 508).

Summarizing the close analysis of Professor Leighton, we might say: Ethics as a study revolves round a rational self whose personality as expressed in action meets a certain average social approval and at the same time transcends such social usage. "The ultimate centers of ethical judgment and action are persons, and since persons judge and act in accordance with rational principles, they must be members of a rational order. Ultimately the principles of ethical valuation express the actual relations of persons to the world-order" (p. 510).

FELIX ARNOLD.

NEW YORK CITY.

ETHICS.

Esquisse d'une morale positive. G. BELOT. Revue philosophique, 1906 LXI, 278-390.

M. Belot's exposition of his positivistic ethics proceeds from an antinomy. (1) A positive morality must derive all its principles exclusively from the motives and purposes of the individual. Its standard for universalizing the individual's actions must be derived

from his ultimate purpose in life. Ordinary naturalism and rationalism, and all systems founded upon authority and tradition, must be rejected because their sanctions are external. Kantianism also errs in seeking to impose one universal law upon all *agents*; morality should instead simply universalize the individual's *actions*, so as to make them mutually harmonious and efficient in achieving his ultimate purpose. Man is only responsible when confronted with himself and his destiny. "His ultimate *duty* can only be his most fundamental *wish*." (2) On the other hand, morality must be recognized as a *given*; we have neither imagined nor invented it. Since an *a priori* investigation of objective morality would be too vague and unreliable, we must instead examine this 'given' inductively. Accordingly, an empirical examination of our actual judgments indicates that we apply a moral judgment to an individual only in so far as his conduct is conceived as engaging the interest of other persons and, finally, of the social group to which he belongs. A review of historical and ethnological 'givens' indicates that every society always imposes moral rules upon the individual in its own interests.

The solution of the antinomy is found in the fact that social rules are imposed as a result of the endeavor of individuals to realize their ends. The 'fundamental wish' of the individual is 'to live in society'; and society — 'the common and universal condition of all human aims and activities' — is the 'supreme end' of the individuals which constitute it, for the very reason that it is the 'universal means' for the accomplishment of every end. Society is then both fact and ideal, given and end. Of course our present social morality is imperfect, and we must recognize the right of individuals to criticize and reform it. However, life in society is ever the individual's ideal, and not only conditions, but also coördinates and organizes all his volitions.

Numerous practical advantages are claimed for this scheme of positive morality. Its appeal to the individual is direct, resting upon the single source of obligation which he can recognize — the opportunity to realize himself. As it is immediately demonstrable, without theological and scientific foundations, it is directly convincing, and particularly valuable for educational purposes. It is precise in its application; and, while it is flexible and progressive, it is also prudent and obligatory. It embraces humanity in all its aspects, not needing to distinguish the physical, economic, and professional man for separate treatment. It recognizes individuality (as versus Kantianism), and does not propose the *same* work for every man, but a *common* work. Organizing all the functions of the individual and shaping them for society, it is the most suitable morality for a democracy.

Some of M. Belot's criticisms of other schools will hardly elicit assent from those not already inclined toward positivism. For instance, his criticisms of Kant hardly do justice to the doctrines of autonomy and the kingdom of ends—conceptions extremely similar to those of M. Belot. However, M. Belot's outline develops his theses in logical order, and is not only extremely suggestive, but in the main convincing. His forthcoming work in the Alcan library will be awaited with interest.

W. K. WRIGHT.

UNIVERSITY OF TEXAS.

BOOKS RECEIVED FROM JANUARY 5 TO FEBRUARY 5, 1907.

Die Vorstellungen der Tiere. K. GRAEFER. Berlin, Reimer, 1906. Pp. 184. M. 3.

Psychology. Part I. *Elemental Consciousness.* W. B. LANE. Lynchburg, Va., Bell Co., 1906. Pp. 208.

The Aesthetic Experience: its Meaning in a Functional Psychology. ELIZ. K. ADAMS. Chicago, Chicago Univ. Press, 1907. Pp. 114.

Practical Dietetics, with Reference to Diet in Disease. A. F. PATTEE. Fourth Ed. Published by the author, Mount Vernon, New York, 1906. Pp. xvi + 312.

Völkerpsychologie, eine Untersuchung der Entwicklungsgesetze von Sprache, Mythos und Sitte. Bd. II. Mythos und Religion. Th. i and ii. Leipzig, Engelmann, 1905-6. Pp. xi + 617, and viii + 481. M. 14 and 11.

Sex and Society, Studies in the Social Psychology of Sex. W. I. THOMAS. University of Chicago Press, 1907. Pp. vii + 325.

Congress of Arts and Science, Universal Exposition St. Louis, 1904. Vol. VIII. Education, Religion. Boston, Houghton, Mifflin, 1907. Pp. x + 493. [Completes the series.]

The Psychology of Religious Belief. J. B. PRATT. New York and London, Macmillans, 1907. Pp. xii + 327.

Report of State Board of Charities and Corrections of the State of California, 1906. Sacramento, Supt. State Printing, 1906. Pp. 221.

Rudolf Eucken's Philosophy of Life. W. R. BOYCE GIBSON. London, Black, 1906. Pp. viii + 168.

Morals in Evolution. A Study in Comparative Ethics. L. T. HOBHOUSE. Two parts in two volumes. New York, Holt, 1906. Pp. xvii + 375, and vii + 294.

Statistical Abstract of the World. H. GANNETT. New York, Wiley, 1907. Pp. viii + 84. [A useful summary of the latest census and other statistical results.]

NOTES AND NEWS.

THE announcement has been made that Professor William James has determined to retire from active teaching at Harvard University after this year. We extend to our honored colleague and long-time collaborator on this REVIEW our hearty congratulations on his extended and most distinguished service to his university and to the profession of teaching.

DR. CHARLES E. GARMAN, professor of moral philosophy and metaphysics in Amherst College, whose 'Commemoration Volume' was reviewed in the January BULLETIN, died on February 9 after a short illness. He was 57 years old and had been connected with Amherst since 1880.

WE also record with regret the death on January 10 of Dr. Walter Smith, professor of philosophy in Lake Forest University, and the death on January 24 of Dr. David Irons, professor of philosophy in Bryn Mawr College.

MR. HERBERT H. WOODROW, A.B. (Michigan), has been appointed demonstrator in the psychological laboratory at Princeton University.

THE Philosophical Union of the University of California has been carrying on for the past year a series of studies introductory to the philosophy of religion, the success of which, according to the *Journal of Philosophy, Psychology and Scientific Methods*, has been such as to determine the Union to continue its work in the same field during the present year. Professor McTaggart's *Some Dogmas of Religion* has been selected as the basis of discussion.

OWING to the illness of the Secretary of the American Psychological Association, we have been compelled to defer publication of the Proceedings till our March number. The meeting of the American Philosophical Association will be reported in the same issue.

THE PSYCHOLOGICAL BULLETIN

RECENT TENDENCIES IN THE PSYCHOLOGICAL THEORY OF VALUES.

BY PROFESSOR WILBUR M. URBAN,

Trinity College.

The psychologist with an eye to the larger aspects of the development of his subject would doubtless learn much from a study of the distribution of topics in the magazine literature during a period of fifteen or twenty years. Among other things he would find, I venture to think, a close dependence of psychological tendencies upon larger philosophical interests and trends. Whatever may be said, from the standpoint of academical discussion, as to the proper affiliations of psychology — whether with philosophy or natural science — it must at least be admitted that up to the present time it has been from philosophy chiefly that psychology has derived its problems.

With such a premise one might have been led, even some years ago, to predict the present revival of interest in the psychology of feeling and will, especially as developed from the point of view of the theory of value. The gradual shifting of the philosophical center of gravity from the problem of knowledge to the problem of values has, for some time now, been creating a body of questions which must, after all is said and done, go to psychological matter of fact for their answers. The sharp antithesis of facts and values might, indeed, temporarily delay the appeal to psychological analysis, but the simple and inevitable necessity of the situation — that every assertion of a worth involves likewise the assertion of its conformity with actual or possible experiences of feeling and will, and their laws — makes the appeal to psychology ultimately unavoidable.

There are, indeed, not lacking certain indications of an actual historical connection between, for instance, the philosophical 'transvaluation of values' attempted by Nietzsche and this new interest in the psychology of valuation; between the recent fideistic tendencies in

France and the interest of Ribot, Paulhan and their followers in a *logique des sentiments* and the theory of affective abstracts; and one might almost venture the prediction that the claim of Pragmatism, that the truth judgment is a form of valuation, must, when we have finally got through with more abstract questions, lead us to a consideration of the question already discussed in other quarters, viz., the relations between knowledge feelings and feelings of value.

Be all this as it may, the appearance in the magazine literature of the last couple years of a concentration of interest upon the topics of value (and feeling in general), sufficient to merit the dignity of characterization as a tendency, gives rise to the hope that the psychology of feeling and will is coming to a consciousness of its function as the foundation of the Geisteswissenschaften which deal with values. Simmel's remarkable book, *Die Philosophie des Geldes*, is merely one indication of what trained psychological analysis may contribute both to the adequate formulation and the solution of the larger problems of a theory of value.

This tendency is the more welcome also because hitherto it has been precisely this region of psychology concerned with feeling and will which has remained most undeveloped. A recent contributor to these pages¹ has called attention to the confusion and divergence of opinion as to both object and method in the psychology of feeling. He might have gone further and pointed out that this condition has been due largely to the absence of any central problem, any heuristic principle, which should control analysis. Such a principle and method was indeed furnished by Meinong over a decade ago when, in his epoch-making book, *Psychologische-ethische Untersuchungen zur Werttheorie*, he announced the principle that the way to the psychology of feeling lay through worth analysis. But until recently the principle remained practically unheeded. The psychology of feeling remained in a wholly phenomenal stage, the question of its functional meaning being largely ignored, and even the phenomenological study was hampered and obscured by the bodily transference of the machinery of the doctrine of elements and their compounding from the region of sensation and perception, where it has a certain methodological value, to the sphere of feeling where its influence has been wholly disturbing.

To the scanty array of books and monographs which owe their inspiration directly or indirectly to Meinong's work² there has been

¹C. H. Johnson, 'The Present State of the Psychology of Feeling,' PSYCH. BULLETIN, 1905, II.

²Cf. the article on 'Worth' in the *Dictionary of Philos. and Psych.*

recently added, as was said, a growing body of magazine literature. A glance at this literature indicates, as might have been expected, that it is Meinong's definition and analysis which has brought it into being, and that, moreover, while it is still concerned with foundations, with questions of definition, there are nevertheless distinguishable a certain unanimity in regard to the nature of the fundamental problems and a certain definite trend of opinion with reference to their solution. The purely psychological problems are three in number. The first is concerned with the *intension* of the definition of worth experience, — is value to be equated with experiences of feeling or desire? — the question of a voluntaristic or affective theory of value. The second problem is one of *differentia*, the differentiation of experiences of value from other experiences of feeling or desire, as the case may be. Here the discussion centers about the formulation of Meinong, that only such feelings as presuppose existential judgments are feelings of value. The third question, closely connected with the second, relates to the *extension* of the definition, the extent of the sphere of worth experience, — more particularly as to its inclusion of æsthetic feelings and feelings of knowledge, certainty, probability, etc. Here the discussion centers largely about Meinong's (and Witasek's) exclusion of the æsthetic from feelings of value.

With regard to the first problem the trend of opinion is decidedly in favor of the affective theory. In addition to the well known works of Meinong and Lipps, the more recent articles of Wilhelmine Liel,¹ of Dürr,² and of Edith Landmann-Kalischer³ contain criticisms, the first of Schwarz's, the latter two of Ehrenfels' formulation of the voluntaristic theory. Without going into the details of the discussion, it may be fairly said, I think, that the case against the voluntaristic theory is practically closed. It is found impossible to equate all types of worth attitude with actual desire, and it is further seen that desire itself as an actual experience presupposes worth feeling.

About the second problem the discussion rages more fiercely, but the weight of the argument seems to be against Meinong's limitation of feelings of value to feelings determined by judgment, and in favor of the inclusion of pre-judgmental and post-judgmental attitudes, more

¹ 'Gegen eine voluntaristische Begründung der Werththeorie;' article in Meinong's *Zur Gegenstandstheorie und Psychologie* (reviewed by the present writer in the *Philosophical Review*, January, 1906.

² 'Zur Frage der Wertbestimmung,' *Archiv für die gesammte Psychologie*, 1905, Bd. VI., Heft 3.

³ 'Ueber den Erkenntniswert ästhetischer Urtheile,' *Archiv für die gesammte Psychologie*, 1905, Bd. V.

especially in favor of the inclusion of the æsthetic in the sphere of worth experience. In varying forms this view is maintained by Lipps,¹ Dürr,² Landmann-Kalischer.³ But it should be noted that while they join in criticism of Meinong's positive definition, there is equal unanimity in favor of the validity of his negative conclusion, that feeling of value is not to be identified with mere 'pleasure-causation,' with feeling viewed merely as the feeling tone of presentation and sensation or as effect of any condition whatsoever, psychological or physiological. It is only feeling attitude, feeling as directed upon an object, which constitutes worth experience. The chief desideratum at present may then be said to be unanimity in the characterization of the conditions or presuppositions of feeling of value, the adequate characterization of the pre-judgmental and post-judgmental attitude.

This fundamental problem of analysis has received its most searching examination in the interesting discussion of Lipps and Meinong, extending through several numbers of the *Archiv für die gesammte Psychologie*, a discussion which arose primarily in connection with the third problem, as to the inclusion or exclusion of æsthetic feelings. In his first article, 'Weiteres zur Einfühlung,' Lipps maintains, primarily in opposition to Witasek's contention that æsthetic feelings are not real but merely imagined (Schein) feelings, the *real* character of the projected feelings in æsthetic *Einfühlung*. To this end the whole question of the validity of the definition of feelings of value, as feelings with existential judgments as their presuppositions, is critically considered and rejected, and an attempt made to define the primary worth experience. His chief contention is that the feeling of reality is the necessary presupposition of the æsthetic experience (therefore of *Einfühlung*) no less than of the practical and ethical, that the æsthetic object is not merely presented, *seemled*, playfully assumed to exist, but is taken as real. But reality feeling does not necessitate existential judgment. Rather is the essential of reality feeling (and with it of worth experience) feelings of activity — in the case of the æsthetic, feelings of activity read into the object — the feelings of activity being conditioned by the pre-determined relation of the object to the conative self. The judgment is therefore unessential to the feeling of value and, even in the case where it enters as part of the total condition of the feeling, it is merely an act (not activity)

¹ 'Weiteres zur Einfühlung,' *Archiv für die gesammte Psych.*, 1905, Bd. IV.

² 'Ueber Urteilsgefühle,' *Ibid.*, Bd. VII., 1906.

³ Cited above.

³ Cited above.

making explicit the experience through acknowledgment of the object. 'Judgment-feelings' are knowledge feelings, feelings of certainty, probability, etc., and therefore only secondary determinants of the feeling of value.

Meinong, in his paper, 'Urtheilsgefühle, was sie sind und was sie nicht sind,'¹ replies to the criticism of Lipps with a further elaboration of his own position and with a criticism of Lipps' description of feelings of value as feelings of activity and his characterization of judgment feelings as knowledge feelings. In this restatement of his position Meinong makes quite clear, for one thing, a point hitherto somewhat obscure — that he has never meant in his judgment criterion anything but judgment in the full logical sense of the word. But while existential judgment is the presupposition of the joy or sorrow which characterizes feelings of value, this judgment is not necessarily categorical but may be hypothetical or disjunctive or even the quasi-logical assumption mode. All these have existence as their *objective*. The main point is that these are not secondary and non-essential, as Lipps maintains, but constitutive. Nor are they knowledge feelings. The real point of difference between knowledge and æsthetic feelings on the one hand, and feelings of value on the other, is that the former have merely *objects*, while the latter *objectives*; the former are concerned only with the *what*, the latter with the *that*, the existence of the object. Only feelings which have objectives are feelings of value. The reality of the æsthetic feelings, the demand of the æsthetically given, as described by Lipps, is of the same sort as the *what* of the sphere of knowledge, predetermined by constructive activities of the subject, but not existent. The object indeed accepted, but not acknowledged as existent.

Of Lipps' reply '*Ueber Urtheilsgefühle*,' full as it is of subtle and enlightening analyses, we can note only one point, but that which is decisive and upon which he concentrates his effort. What does Meinong really mean by this expression *objective* (and his distinction of object from objective), this existence which is given only in judgment? Can he mean anything except the demand of the object upon our acceptance? From the point of view of psychological analysis certainly nothing but this. Now judgment is, to be sure, the later admission, acknowledgment, of this demand (*Forderung*), but the feeling of reality which comes with the demand is prior to this act of acknowledgment. These demands are of various types — some more subjective, some more objective than others — but the existential predicate constitutes the acceptance of only one type of demand and therefore only

¹ *Archiv für die gesammte Psychologie*, 1905, Bd. VI.

one phase of reality feeling. Unhindered activity is the source of feelings of value, as feelings of reality. The predetermined æsthetic object is one field of such activity, is one form of objective or demand. The judgment of existence merely registers the fact that a demand has maintained itself in opposition to other demands, is merely a secondary modification of the primary feeling of reality and value.

It appears, to the present writer at least, that this discussion has done much to clear the air. Through it, it is to be hoped, both Meinong and Lipps will be led to modify the unpsychological elements in their definitions; for both of them err in this direction, the one finding the criterion of the feeling of value in a transcendental distinction between object and objective, the other in an equally transcendental distinction between the self and the not-self. The difficulty in Meinong's conception arises from his extreme distinction between the *what* and the *that* (the *Sosein* and *Sein*) criticized by the present writer at more length in another connection.¹ The essentially derived and secondary character of the existential judgment—as an explicit acknowledgment of a reality coefficient, a demand, a *coefficient of control*, to use Professor Baldwin's admirable term—seems undeniable. It is the mere acceptance of a demand or control, whether objective or subjective (dispositional) in origin, which constitutes the presupposition of feelings of value. No other conception is psychological and genetic. On the other hand, Lipps is equally unpsychological and ungenetic when he makes the relation of the feeling to the ego the criterion of feelings of value. The consciousness of this relation (the acknowledgment of subjective control), is as secondary and derived as the existential judgment. A definition and classification of feelings of value must be genetic in character and include pre-judgmental, judgmental and post-judgmental attitudes.

In this connection the definition of Dürr, in the paper already referred to, although purely analytical, is interesting as seeking to include all the various types of attitude which constitute worth experience.

In addition to these discussions of fundamental questions there are certain other recent developments in the analysis of feeling which demand brief notice in view of their close connection with the general psychological theory of values. For one thing they afford ground for the view that the most fruitful contributions to the psychology of feeling in general must come from analysis of worth experience. Since the introduction of the concepts of *Scheingefühle*, presented feelings

¹ In the review of *Zur Gegenstandstheorie und Psychologie*, already referred to.

and assumption feelings, and their use on a large scale by Witasek in his *Asthetik*, there has been a further development by Saxinger in two papers,¹ in which he subjects these supposed phenomena to closer analysis and seeks to determine their laws. We may, as the present writer does, agree with Lipps, in the article already considered, that the concept of an unreal feeling is unpsychological, if not untenable from any point of view, and with J. Segal² that the concepts of Scheingefühl and Gefühlsvorstellung have had unfortunate results for recent æsthetic theory, and at the same time recognize the new facts which this view has brought to light.

The main point of Saxinger's studies is the differentiation, both as to characteristics and mode of origin, of certain aspects or phases of feeling (and desire) known as feelings and desires of the imagination, from the real feelings, and to determine their function in the continuous life of feeling and conation. They differ from actual feeling, it is held, merely in the fact that they have assumptions instead of judgments as presuppositions and are not subject to diminution of intensity through repetition. From this difference with respect to the law governing intensity of feeling he infers totally different dispositions as the basis of the actualization of the feelings, and by an analysis of concrete cases seeks to show that each type of feeling is independent of the influence of the other, although admitting that the feelings of the imagination may function as representative 'feeling signs' for actual worth feelings. All his analyses indicate that he has before his mind the same phenomena as have been variously characterized as affective signs, affective generals and affective abstracts, in connection with which this fact of independence of the law of diminution of intensity with repetition has already been noted. In fact he seeks to identify these phenomena with his feelings of imagination, describing them 'as feelings of the imagination attaching directly through habit with substrate ideas, this direct attachment to be explained from specific dispositions to feelings of the imagination actualized by abstract ideas.'

As to this identification, it seems clear that Saxinger is merely studying from the point of view of functional presuppositions the same phenomena which the theory of affective abstracts sought to take account of in their aspect of content. This later contribution will probably

¹ Saxinger, 'Ueber die Natur der Phantasiegefühle und Phantasiebegehungen,' *Untersuchungen zur Gegenstandstheorie und Psychologie* (reviewed by present writer, *Philosophical Review*, January, 1896). 'Beiträge zur Lehre von der emotionalen Phantasie,' *Zeitschrift für Psychol.*, Bd. XI., Heft 3.

² 'Die bewusste Selbsttäuschung als Kern des æsthetischen Geniessens,' *Archiv für die gesammte Psychol.*, 1905, Bd. VI.

enable us to see more clearly their functional rôle as representatives of actual particular emotions, but if one may venture an assertion without developing the grounds (which would be here impossible), it is more than probable that the position that these are feelings of imagination, *toto genere* different from real feelings, with different dispositional basis and neither modifying nor being modified by real feelings of value, will prove untenable. They are but special modifications, meanings, of real feelings; and their representative capacity arises from that fact. In this connection it is interesting to note, merely in passing, that the latest contribution from the French psychologists to this question¹ indicates a tendency to seek a functional explanation of the origin of emotional abstracts, instead of explaining them as fusions of feelings or as merely sharing in the generalization of the ideas they accompany.

No attempt, it may be said in conclusion, has recently been made in the direction of larger, more constructive work, unless the work of Simmel, already referred to, be considered. Despite the brilliancy of its analyses and the fund of psychological suggestions which it contains, its main object is philosophical and social rather than psychological. The earlier attempts at systematic constructions (Meinong and Ehrenfels) were too largely built upon principles not firmly enough established, and also influenced by philosophical pre-conceptions. The present activity, largely critical and foundational, indicates certain definite trends, but can be said to furnish scarcely more than materials for more constructive work. A constructive principle is still lacking — and this, it appears to the present writer, must be genetic in character. When once analysis has determined with some degree of unanimity the pre-judgmental, post-judgmental and judgmental attitudes in valuation, it may then be possible to show them in their genetic developmental relations. The various attitudes which find expression in judgments of value of the different types (intellectual, ethical and æsthetic) could then be derived, perhaps, by genetic progressions, value movements, from the primary feelings of value. When that point has been reached it may be possible to undertake an evaluation of these different attitudes and their objects, a preliminary contribution to which is given in the very suggestive article of Edith Landmann-Kalischer already referred to, where it is maintained that primary values are objective and that it is possible to distinguish between subjectively and objectively conditioned feelings just as certainly as between subjectively and objectively conditioned perceptions.

¹ L. Dugas, 'Sur les abstraits émotionnels,' *Revue philos.*, 1905, LX.

SIXTH ANNUAL MEETING OF THE AMERICAN PHILOSOPHICAL ASSOCIATION.

The sixth meeting of the American Philosophical Association was held at Columbia University, New York City, December 27 and 28, 1906, in affiliation with the American Association for the Advancement of Science and a number of other societies. About eighty members of the Association attended the sessions, and a large gathering listened to the reading of the president's address on the afternoon of the 28th in Earl Hall. On the 27th the Association met with the American Psychological Association for the presidential address of the latter society. At the business meeting H. N. Gardiner (Smith) was elected president for the next year, Ralph B. Perry (Harvard) vice-president, and Frank Thilly (Cornell) secretary-treasurer. Ernest Albee (Cornell), Charles M. Bakewell (Yale), and Herbert G. Lord (Columbia) were elected to the Executive Committee, and several new members were admitted to the Association. It was voted to hold the next meeting in Ithaca.

ABSTRACTS OF PAPERS.

President's Address: *The Energies of Men.* WILLIAM JAMES.

This address was printed in full in the *Philosophical Review*, January, 1907.

Some Points of Relation between Music and the Emotions. HALBERT H. BRITAN.

The æsthetic value of music may lie either (1) in its effect in stimulating and arousing the emotions, or (2) in the pleasure incident to the tonal changes of melodic and harmonic progression. The literature on the subject tends to favor the latter view, while the present paper supports the former. Sounds excite the emotions more than do color and form, and musical sounds partake of this characteristic. The musician can shape the emotional life of his hearers by attention to several distinct factors: rhythm, harmonic modes, resolutions, pitch, and the variations in timbre, tempo, and intensity which form the technique of musical expression. But further, a musical composition may influence the emotions in the same way as an art product of another sort (painting or literature): through the unity in thought and design, the strength and grace in expression, the originality and

significance in the musical thought expressed. That all of these factors are of peculiar emotional significance in music is due (1) to the conceptual vagueness of the organic factors, and (2) to the essentially dynamic nature of these factors. Musical ideas are suggestive rather than expressive; hence they allow a free play of the imagination and of association controlled by emotional congruity; and because they are dynamic rather than static they call forth a response in the most motile aspect of consciousness — the emotions.

The Concreteness of Thought. GEORGE H. SABINE.

While thinkers generally agree that only experience is real, and this only in proportion as it is concrete, current conceptions of concrete experience and of the relation of thought to the concrete differ greatly. Examination of concrete experience shows that it possesses the character of immediacy, but that the immediate must be further qualified as the individual, *i. e.*, as that which possesses the richest possible content. Individuality, however, implies a position in an organized system, and organic unity is similarly a postulate of generalizing thought, for true generalization must reach real synthetic principles. The attempt to define the concrete, therefore, can not stop short of an experience in which universality and individuality are at once completely satisfied — in which perfect integration is combined with perfect differentiation. Only the Absolute, therefore, is fully concrete, and for finite experience the Absolute can only be an ideal of perfected rationality. The concreteness which we attribute to actual experience rests on the fact that such experience is always partially organized. Thought, then, is to be conceived as a function of concrete rationality by which experience is at once universalized and individualized. If this conception is correct, it follows (1) that the notion of a pure experience must be given up; (2) that no distinction in principle can be drawn between reflective and constitutive thought; and (3) that reality is to be conceived, not as pure experience, but as the ideally rational experience which is the goal of thought.

The Nature of Explanation. WALTER T. MARVIN.

Explanation is an analysis of a whole into parts, or of a complexity into elements which are simpler and whose relations are simpler. Four processes are involved in the growth of information: new sensations, association, analytic attention, and comparison; the two latter are preëminently the cognitive processes; that is to say, analysis of the content of apprehension, together with comparison of the elements, is the special work of knowledge. Thus, explanation differs from the other

stages of knowledge merely in thoroughness. Two distinct processes are denoted by the term analysis: (1) Substitution of one content for another — one which seems to us a better or truer presentation or representation of it; (2) analysis proper, which is the work of the analytic attention. This is the process actually involved in explanation. There are two distinct kinds of explanation: analysis (1) of whole into parts, and (2) of complexities into their elements. The first leads to some form of atomic hypothesis, the second to abstract general laws. The paper illustrates these types by examples of well-known scientific theories.

A New Syllogistic Canon. JOHN G. HIBBEN.

This paper will be printed in full in the *Philosophical Review*.

The Aims and Results of the Society for Psychical Research. J. H. HYSLOP.

This paper will be printed in full in the *Journal of the Society for Psychical Research*.

The View that the Real is Control. GUY A. TAWNEY.

(1) In the world of thought, reality is said to be that which controls in the further activities of experience. Reality is made of no other stuff than valid judgments. Judgment is a process through which reality evolves; it is therefore no mere subjective mental state. The last member of the judgment series, indeed, is still untested; there is a realm of uncertainty and possible error — which is, but is not real. That which controls in the logical sense is always objective, but the real is vastly more than the objective. (2) Control in the world of action is usually conceived as external limitation to activity. Such characterizations of the real as 'resistance to muscular effort,' 'limitation of activity,' 'uncontrollableness' imply that the real is a sort of straitjacket of the mind. It was before sentience was, and abides when sentience ceases. The subject or agent is by this definition unreal. The activity is set over against the control. This dualism is clearly stated in Baldwin's doctrine of 'subjective' and 'outer' controls. Such dualism of controls is Kantian so far as it goes. It leads, in some, to the position that the real subject of every judgment is outside the mind, while all that is predicated of it is inside the mind. That which controls in the world of action is always objective but implies much more, which must also be said to belong to the real world. (3) Control in the world of immediacy. Here the real is determined by the free selection of a subject, ego, soul, or spirit. It has both a positive and a negative side — a concentration upon what

satisfies, and withdrawal from what does not satisfy. By means of 'love' and 'will' we reach a point to which thought unaided cannot attain. Once more we are dealing here with what for reflection must be objective and given—the datum of judgment. But it does not exhaust the real. (4) Appeal to the social control does not render the views discussed more tenable, because the social character of the object of knowledge is presupposed by them. That which controls is still the objective only, and cannot be said to be equivalent to the real.

The Ugly Infinite and the Good-for-nothing Absolute. CHARLES M. BAKEWELL.

Philosophy has long been pursued by the antinomy of the Infinite and the Absolute. By the Infinite is here meant the boundless, the endless regress; and by the Absolute the fixed and definite and final, whether as standard of reference, scale of worth, or world of meaning. It is not too much to say that most of the discussions of fundamental problems in philosophy center on this antinomy and that the chief effort of philosophy has been to discover a way of solving it. In earlier times the partisans of the Absolute held sway; but in recent times, owing partly to the conquests made by the theory of evolution in all fields of knowledge, the partisans of the Infinite are coming to be more and more in evidence. Idealists fall into two fairly distinct groups, according as their real-ideal is taken statically or dynamically. The static group may, with some plausibility, be charged with introducing the conception of an Absolute which is useless in the interpretation of experience. Yet even against them, as tested by actual results, the charge cannot be fully made good; and as applied to the dynamic group it is wholly without force. It rests upon the assumptions that, because the idealist believes in a world of eternal truth where values are assessed with finality, he must, in order to make any significant use of such a conception, himself have had this completed vision. But the idealist does not thus 'affect omniscience.' He begins with experience just as he, with all his limitations and ignorance, finds it; but he finds the value of the conception of 'the fixed' in the possibility of working away from this starting-point by definite and sure steps into a world of meaning where nothing is ever lost. Progress is progress, and not merely change, because a less complete view can once for all be set aside in favor of a more complete; and this is clearly intelligible only provided all such views have their position fixed in a scale of worth and meaning which we are gradually finding out, but which we do not make as suits our passing mood or present felt need. This conception is one upon which we lean in every step in our search after truth and reality.

Are Time and Space of Coördinate Philosophical Significance?

H. RUTGERS MARSHALL.

Our concepts of time and space are based upon temporal and spacial experiences. (1) Our temporal experiences are determined by the existence, in connection with presentations, of some phase of time quality, which is a general quality of all presentations, and which, like the algedonic quality (pain-indifference-pleasure), displays three phases: pastness-presentness-futureness. Each specific presentation is discovered to display some one of these if we choose to look for it. The time quality thus appears to be a general quality of all presentations — no presentation is ever timeless. (2) Our spacial experiences are determined by the existence, in connection with presentations, of what we may call the spacial quality. If this were a general quality of all presentations, as the time quality is, then we should find that all presentations are spacially qualified, and that no presentation is non-spacial. But this proves not to be the case: although a large proportion of our presentations are spacially qualified, some are not — for instance, the group of concepts which cannot be traced back to percepts (*e. g.*, 'factor of safety,' 'virtue') and especially the so-called 'feelings of relation' (*e. g.*, what Professor James calls the 'feeling of *but*,' which, as he says, is as definitely a presentation as a 'feeling of blue'). These concepts and feelings of relation are definite presentations, but they are not spacially qualified, *i. e.*, they are non-spacial. (3) The temporal quality and the spacial quality thus appear to be on different planes, so to speak; and this leads us to ask whether, in view of the fact that our concepts of time and space are based respectively upon our temporal and spacial experiences, we are justified in classing time and space together and treating them as of coördinate philosophical significance, as is so commonly done.

Some Inadequacies in the Modern Theory of Judgment. W.

H. SHELDON.

The problem of judgment comprises three questions: the make-up of its content (both psychical and logical), the purpose which that content serves, and the fitness of the content to fulfill the purpose. These are the questions of structure, function, and their mutual adaptation. The generally accepted modern theory has revealed the function of the judgment-content (to refer to reality or to suggest action upon the environment); many logicians also have worked out theories of structure (the individual-universal theory, the stimulus-reaction theory, the synthesis theory, the partition theory, etc.), but scarcely any one has

attempted to show how the structure is adapted to the function of suggesting reality. Herein lies the inadequacy of modern theories of judgment.

Descriptive and Normative Sciences. ERNEST ALBEE.

This paper was printed in full in the *Philosophical Review*, January, 1907.

Knowledge as Immediate Experience and a Function of Love.

LEWIS F. HITE.

The reflective knowledge of concrete experience is more or less systematic, but such knowledge presupposes immediate knowledge as its basis. Immediate knowledge is a unique, simple, complete experience, which contains in itself, unified and harmonized, all the complexity, variety, and relations that subsequently grow out of it by the developing processes of attention, reflection, analysis, and synthesis. Experience has two aspects, cognitive and emotional. (1) The cognitive is that which is presented in the function of self-representation. Experience, in its first intention, is immediately self-conscious. The paper examines in detail the nature of immediate knowledge by means of a construction which supposes a man placed under conditions where the only experience he can have is that of the blue sky. Then the situation is developed by adding sound, and finally by supposing all the senses to be opened at once. It is assumed in this case that there would be complete blending, and that the experience would be of the same type as the simple blue. It is maintained that the cognitive aspect of this experience is its existence as its own precise, unique kind or quality. (2) The emotional, æsthetic, and voluntary aspects of the experience are interpreted and developed as characters which are otherwise covered by the general term love. Love, in accordance with Swedenborg's doctrine, is taken as the fundamental and all-inclusive experience; experience at bottom is love, and all the functions and characters of experience are developments of love. Love, in the process of self-representation, presents that aspect of experience which we call knowledge. Knowledge, as a complete systematic whole, would be the final stage of this process of self-representation.

Cadwallader Colden of King's College. I. WOODBRIDGE RILEY.

A sketch of the life and doctrines of Cadwallader Colden (1688-1776).

Philosophy and Religion. A. T. ORMOND. (Read by title.)

The Meaning of Moral Goodness. RALPH B. PERRY.

The aim of the present paper is the elucidation of the real moral

goodness contained in experience but only imperfectly discerned in moral sentiment and opinion. To define moral goodness it is necessary to distinguish a field of moral values within which moral good, evil, and indifference are systematically related. Values which approximate morality appear when an organism is introduced into a mechanical system. Mechanical objects and action now bear favorably, unfavorably, or indifferently upon the organism's preservation, and are said to be good, bad, or indifferent accordingly; these values are strictly extrinsic. At the same time there appear the values proper to the organism itself. The elementary organism is an organization whose action is determined, at any rate in part, by the law of its own preservation; such action possesses value through its reflex consequences, whether beneficial, injurious, or indifferent. Goodness, badness, and indifference of this type may be termed *biological* values. *Moral* value arises only when the simple interests of the elementary organism become differentiated or affiliated in such wise as to form higher synthetic interests. Differentiation appears in the case of the individual self, affiliation in the case of the social group. In both cases the sub-interest possesses moral value in consideration of its bearing upon the controlling interest: insofar as the sub-interest contributes to the controlling interest, it possesses moral goodness; insofar as it detracts, it possesses moral evil; and insofar as it is inappreciable in either respect, it possesses moral indifference. Moral value in the above sense may be attributed to interested action or conduct, to self-determining individuals or selves, to institutions, social groups, ideals, and principles.

A Factor in the Evolution of Morality. F. C. FRENCH.

Action for the good of others, determined by instincts, habits, sympathetic impulses, and the like, appeared at an early stage of animal life; but conscience, as a sense of duty and personal responsibility, does not emerge until a considerably later period in human development. Many facts point to the view that primitive self-consciousness was a group-consciousness rather than an individual self-consciousness. This paper aims to show that the first rudimentary form of moral obligation is found in the taboo idea. At a later stage of religious development (*e. g.*, among the Hebrews) the taboos are regarded as commands of the Deity, but this is an *ex post facto* explanation. Earlier than any organized religion man learns to dread and avoid the mysteriously dangerous. 'Touch not the unclean thing,' is the first categorical imperative. This primitive imperative, ethical in form but for the most part unethical in content, affords exactly the

stepping-stone we need to bridge the chasm between the non-moral and the moral. The ethical value of taboo is that it gave the first impulse to the birth of that sense of oughtness which has made man a responsible moral being. Taboo is conscience in embryo.

Some Requisites of a Theory of Ethical Values. WALTER G. EVERETT. (Read by title.)

MEETING OF THE SOUTHERN SOCIETY.

The second meeting of the Southern Society for Philosophy and Psychology was held on Friday, December 28, 1906, in Montgomery, Alabama, in connection with the annual meeting of the Southern Educational Association. Owing to a variety of unexpected causes, the attendance was not large, and most of the papers which had been offered for this meeting were not read. Dr. J. H. Pearce, of the Alabama Brenau, presented 'An Interpretation of some Sensory Illusions,' in which he undertook to generalize the dominance of secondary over primary stimuli in several types of illusions in terms of the law of gravity and to show that it applies to objects of consciousness as well as to objects in the spatial world. Miss Celestia S. Parrish reported the new and enlarged equipment of the psychological laboratory at the State Normal School, Athens, Georgia, and sketched some of the problems under investigation. Professor E. F. Buchner presented a report on the progress of psychology during the current year (published in the January issue of the BULLETIN).

The following were, upon nomination by the Council, elected to membership in the Society: Dr. Mary K. Benedict, Sweet Briar Institute for Women; Professor Charles C. J. Bennett, Louisiana State University; Professor A. B. Coffee, William and Mary College; Professor Frederick Eby, Baylor University; Professor John G. Harrison, Mercer University; Professor Williston S. Hough, George Washington University; Professor Elmer E. Jones, Virginia Female Normal School; Professor M. A. Martin, Woman's College, Richmond, Va.; Dr. J. F. Messenger, Virginia Female Normal School; and Professor R. M. Ogden, University of Tennessee.

In the absence of a majority of the members of the Council, the Society voted to ratify such action as to officers for next year as the Council may subsequently take.

PSYCHOLOGICAL LITERATURE.

BALDWIN'S FUNCTIONAL LOGIC.

Thought and Things or Genetic Logic. JAMES MARK BALDWIN.
3 vols. Vol. I., *Functional Logic*. London, Swan, Sonnenschein
& Company; New York, Macmillan Company, 1906. Pp. xiv +
273.

This is the most comprehensive attempt in Logic yet made in America. Aside from the question of its success — which of course cannot be passed upon until the remaining and larger portions of the work appear — the fact that such a program is offered, and the general standpoint and method of the treatment are further evidence that philosophy in America is rapidly passing from the absorbing, translating, albeit necessary, period of German apprenticeship into a free and initiative adulthood.

As has been so repeatedly pointed out by various writers representing the so-called 'pragmatic' movement, the most obvious and immediate field for reconstructive applications of the 'instrumental' view of thought is the field in which the movement started — logic. The view that regards thought as supporting and supported by the other phases of experience, rather than as a wholly independent strand, patently calls for an account of the *way* in which the other 'modes' of experience condition and are conditioned by thought and of the *way* in which the various stages of thought determine each other, — in short, for a 'genetic logic.' This, in general, is the task Professor Baldwin has undertaken.

However, Professor Baldwin wishes it understood at the start — though one would not have to read far to discover the fact for himself — that he is not a 'pragmatist' in any 'alarming' sense of the term. Indeed, 'pragmatism' is freely criticised throughout the volume. Whether in these rejections of pragmatism Professor Baldwin succeeds in avoiding a static absolutism, which he also explicitly disavows, will be clearer in the end.

The scope of the work is not confined to the stages and processes of reflection as such, but aims to follow the entire history of the cognitive function through what are called the 'pre-logical,' 'quasi-logical,' 'logical-proper' and 'hyper-logical' stages. The present volume

contains the treatment of the first two of these periods under the general title of *Functional Logic*. Volume II. with the caption *Genetic Theory of Thought or Experimental Logic*, is to deal with the problem of truth and falsity. Volume III. *Genetic Logic of Reality*, will treat of the relation of thought to reality — 'carrying the treatment into the hyper-logical functions — æsthetic, rational, etc., drawing conclusions for real logic and philosophy.'

Even these bare headings, especially those of 'Experimental' and 'Real' logic, tempt one to speculations on the implications of such divisions — speculations which must, however, be suppressed until the appearance of the other volumes. It is indeed difficult enough to interpret justly the immediate contents of the present volume without its complements. The meaning of many terms, especially some of Professor Baldwin's new ones and his new uses of old ones in this first volume, may be clearer when the descriptions of the later stages appear.

Passing to the contents of the volume, perhaps the most significant part of the introduction is the statement of what are called the 'axioms and postulates' of 'genetic science,' and the 'canons' of genetic logic. These contain a recognition of two or three important conceptions. First, that development, evolution, is an actual movement in *reality* — not mere appearance, nor an unrolling of an already determined 'implicit' reality. This is expressed in the 'Canon of actuality' and 'the Fallacy of the implicit' (p. 24), and on page 13 where we are told that explanatory logic 'studies thought as instrumental to a genetically built up and evolving reality' in contrast with 'speculative logic of the metaphysicians' which 'makes the logical nature of reality the prius.' From this it follows that every cognitive content and 'mode' must be evaluated in its own context, and is not to be referred to an ultimate type nor taken as an absolute type for other modes and contents. Yet these thoroughly developmental passages are immediately followed by this: "It [explanatory logic] may find *the* all-inclusive and *ultimate* meaning of experience to be given — not in the thought mode but in a hyper-logical, an æsthetic or even mystical mode of experience" (Italics mine). That the thought 'mode' is ever passing into a mode of the immediate type which may perhaps be called 'æsthetic' has been the nerve of 'pragmatic' doctrines from the beginning. But how, if reality is essentially developmental, can the æsthetic be any more 'ultimate' than any other mode and how is there to be found here or anywhere else an 'ultimate' and 'all-inclusive' meaning? This perhaps is one of the questions that should

await the other volumes. But there are enough of such passages in this volume to make the reader wonder whether Professor Baldwin's conception of 'a developmental reality' is not still paying tribute to static absolutism.

Returning to the exposition, the cognitive function is traced through the following modes which traverse the four general stages given above: The 'sense-mode'; image-mode, including memory and fancy; play-mode; substantive-mode; subject-mode — reflection; logical-mode, including belief and predication; æsthetic-mode; ethical-mode. Each of these modes has its corresponding content or object — 'sense-object,' 'image-object,' etc.

Professor Baldwin begins with what he calls the 'presentative' or 'projective' as the primitive cognitive content. In the first account this primitive content appears to be absolutely given. It simply appears in Professor Baldwin's own figure 'as a panorama.' But further along we find that 'selection,' 'discrimination,' and therefore representation are involved. We are told (pp. 132 and 137) that this '*primum cognitum*' must always mean something; that in it 'there are always both complications of content and fulfillments of interest.' This means, of course, that this '*primum cognitum*' is as much representative as presentative or 'projective'; that sense perception and memory begin and develop together.

This suggests that in his treatment Professor Baldwin follows what Caird calls the method of 'regression,' in which earlier statements are constantly revised and supplemented by the results of the later exposition. Doubtless for non-absolute beings under the necessity of presenting a simultaneous development in a serial form, this method, to a certain extent, is unavoidable. But, in using it, the earlier statements should be carefully qualified in order to protect the reader from confusion and the author from misinterpretation.

In this account of the primitive object the author criticises 'the writings of Professor Dewey and others,' which have attempted to state the object in terms of the interruption — or, to use Professor Baldwin's term, the 'embarrassment' — of habit and the reconstructive activities of attention. He says this cannot always be done; 'for it often happens that a new and unwelcome object simply forces itself upon us' (p. 50). But why should this 'forced' character prevent a statement of the object in terms of habit and attention? It seems scarcely more than the time-honored statement of apperception to say that, however 'unwelcome' or 'forced' the object may be, it cannot 'get into' consciousness by any other way than the already existing

and active system of habits and attention. And that a new object could not be constructed in consciousness without some degree of interruption and reconstruction of the preëxisting coördination would seem equally obvious. All this is from the standpoint of the ordinary dualism of organism, including 'a mind,' and environment from which Professor Baldwin seems to write much of the time. But if now we conceive of that activity which *includes* organism and environment as a vast moving complex of habit and attention, then we may state the *entire* nature and significance of the object in terms of those functions. Moreover, it is noteworthy that Professor Baldwin himself finds the *motif* for all his further important differentiations, such as inner-outer, mind-body, subject-object, etc., precisely in the 'embarrassments,' 'failures,' 'ambiguities,' etc., arising in the preceding stages. (Cf. pp. 186-240, 244, 253 ff.)

The account of the 'image-mode' is very suggestive — especially the conception of play as the forerunner of reflection. The free activity of imagery in play is made the analogue of the process of the construction of hypotheses. Whether the reader accepts all of the author's statements of the criteria of the differentiations of inner and outer, fact and fancy, physical and psychical, object and subject, he must agree that the discussion is timely in view of the constant confusion of these distinctions.

Some readers may feel that after the introduction the author might well have begun with Chapter VII., on 'Meaning.' For it here appears that all cognitive content must be or have meaning. This also accounts for the fact that a considerable measure of the preceding exposition is repeated in this chapter. Some readers of this chapter may be confused by the double use of the term *meaning*. In the beginning we are well told that 'It is in the passage from bare recognition of each item as being what it is, to its treatment as being not what it is, but what it *may become or be used as* that psychic meanings as such arise' (p. 131). On the other hand the term 'meaning' is used throughout for simple content of any kind apart from this pointing or referring function which we have read is the very essence of meaning. In this second sense of the term we are told that the content is simply 'found to *be* just *what* it means' (p. 131). Of course a thing can both be and mean at the same time, but that it can be *what it means* is quite another and to the reviewer an impossible affair. Professor Baldwin himself explicitly raises the point under the question, 'are meaningless objects possible?' (pp. 137 and 185). His answer is: 'Theoretically, yes;' 'practically, no,' 'since the changes in the life of

concrete thought are so constantly occurring . . . that such neutrality *is really* never realized' (italics mine). Now if we believe this is *actually* the case, why this 'theoretical' conception to the contrary? Where we do *not* know what 'really is' we may fill in with hypothetical conceptions. But we surely do not construct hypothetical conceptions of a situation which we *have already accepted* as quite otherwise.

The chapter on 'negative meaning' is one of the best parts of this discussion and also illustrates further the 'regressive' method by carrying back into the preceding stage the needed element of 'embarrassment,' 'ambiguity,' etc. They are here given a central position which they maintain, with occasional lapses, throughout the rest of the volume though apparently without the author's explicit recognition of this position.

The next chapter is on the 'substantive mode,'—the stage in which the mind-body dualism develops. It begins with an account of how this distinction develops from the earlier ones of 'inner and outer' and of 'images and things.' The earlier dualisms belong to the pre-experimental period when experience is relatively uncontrolled, where the 'outer' is simply the sense content into which memory images *happen* to be convertible, the 'inner' being the images which *happen* to be unconverted or unconvertible, *i. e.*, 'images detached from their suggested termini' (p. 88). But as the experimental—the hypothetical—function of imagery develops, there comes to be more and more detachment of these images from immediate fulfillment and consequently more continuity and solidarity in them until they get a substantiation as 'mind.' On the other hand this is accompanied by a corresponding regularity and dependableness in the sense content into which these images are convertible until it is substantiated as 'body.' Mind-body is then the scientific correlative of the pre-scientific 'inner-outer.'

At this point the treatment takes up the nature of general and universal meaning which is held to belong to this chapter since "Those meanings involve cognition of relation and it is by the progression into the 'substantive mode' that this is first achieved." There is room for discussion of this point but I must pass on to Professor Baldwin's conception of general and universal which, I think, is unusual. He has identified generality and universality with verification,—proof. In the experimental stage of thought certain contents are selected as hypotheses—as 'instrumental.' But 'these are individuated as schematic not as general or universal' (p. 215). 'Schematic' means that

a content is serving as a 'schema' for the interpretation and organization of new material. It is hypothetical. Then if this statement—that such a content is not general nor universal—referred to the pre-scientific stage in which a child might call a horse 'a big dog' or expect to be burnt by an orange, thus using dog and the color of the candle flame as 'schemata,' one could readily agree that such a 'schema' is no *logical* general nor universal. But we are explicitly told that this interpretation is to apply to 'the term hypothesis *as scientific thinkers use it*' (italic mine). The distinction is further elaborated as follows: "As meanings the 'schema' and the general or concept are distinguished as one *selective* and *prospective*, the other *recognitive* and *retrospective*. . . . One is an expectation, the other is a fulfillment. It is, in the latter progression [and this is the scientific stage], the difference between conjecture and truth; . . . between research and the assertion of proof; between utility and reasonableness" (brackets mine). In passing one wonders what the antithesis between a 'research hypothesis' and reasonableness can mean. One of the 'rules' in the text-books of logic is that 'the hypothesis must be reasonable.' To be sure all utility is not reasoned, *e. g.*, the case of the burnt child, etc. But, to put a scientific hypothesis as a case of mere utility over against 'reasonableness,' seems to imply a 'pure' reason which would seem strange in a 'functional logic.'

Of course a writer is always free to give terms new connotations. But when he does, he must carefully cover the ground of the old connotation. If the 'schema' as a scientific hypothesis is neither general nor universal, what is it? It surely is not 'singular' nor is it 'particular' by the definition of the latter (p. 231). Professor Baldwin says (p. 271) it is 'just a hypothetical meaning' which becomes general when verified. Thus the hypothesis 'horse,' which I apply to an object about which I am uncertain, becomes general when verified; when 'I treat the horse to sugar beware of his legs,' etc. But this reads very much like the usual descriptions of the way in which experience passes out of the 'general' into the specific and concrete where the general or universal as such ceases to exist. Surely the horse to which I feed sugar etc. is not 'general.' To be sure the material of my hypothesis must have an established character; it must already have definition—otherwise of course it could not serve as an idea—as a 'schema.' But this established, defined character does not in itself make it general. Its generality consists in its *use* to define and further develop new material. In other words, it would seem that the selection, the construction of the hypothesis is the very essence of the act

of generalization. Again, the universal is simply a 'general' which: (1) is 'irrevocable'; (2) 'admits of no exceptions' (p. 224). If these statements be applied to the universal as the hypothesis *in* the act of reasoning, meaning thereby that as used *in this problem* the hypothetical content must preserve a steadfast character—must be consistent, there is no difficulty. But if taken absolutely they must make trouble for a 'dynamic view of reality.'

An interesting corollary of this view of 'general' and 'universal' appears in its relation to idealization (pp. 232 ff.). Ideal content is well described as that which serves as an 'aim'—an 'intent' or as the selector and organizer of some other content. Idealization is thus concerned with change—adaptation. But the general and universal are the fixed and the irrevocable. Professor Baldwin does not blink the conclusion which he states thus: 'The general is a finished retrospective, relational meaning from which in its very conception ideal reference is excluded!' (p. 236).

The last chapter, which is one of the most stimulating in the volume, is an account of the genesis of the subject-object dualism and the transition to the logical stage proper. The rise of the subject-object distinction is due to 'embarrassments' arising in the mind-body antithesis. My own body is both outer and inner, physical and mental. Nor 'can I treat another's body simply as body, equivalent to thing, for it means to me thing plus the characters of capriciousness, activity etc., which are the essence of my meaning of mind' (p. 253). On the other hand mind is equally ambiguous—is equally inner and outer, whether my own or another's. The solution of these 'ambiguities' with their resulting 'embarrassments' is found by both sides of these antitheses renouncing their substantive character and becoming ideas—free 'detached,' 'objective' contents in a world of thought, or, as Professor Baldwin calls it, of 'experience.' So that '*on occasion this or that meaning or interpretation may be given the exclusive place which the dominant interest or the germane context of the moment determines.*' This is properly called 'the standpoint of reflection.' For in the stage of forming and testing hypotheses all experience is regarded as *possibly* ideal. Everything is grist for the logical mill.

But Professor Baldwin finds yet another important characteristic of the logical stage. These ideas must be ideas to and for a subject. This subject is constituted by the 'effort'—the 'activity' element (p. 259) which thus appears, contrary to the doctrine of many psychologists—the author among them—to be taken out of the idea, leaving the latter a mere passive content. To be an idea then means to be an

'experience' of and for a subject. Hence the author's characterization of the logical stage as that of 'experience.'

The reader will probably find 'difficulties' in this chapter. One of the most obvious is that although these ideal contents are supposed to have surrendered their antithetical characters so as to leave them free for determination as the specific occasion may require, — yet we find (p. 268) that '*this entire content is thought as inner content.*' Yet again (p. 270) we read that these ideas 'are represented by the process of thought *as in their original mode.*' Apparently, then, the earlier antithesis of inner-outer still remains and yet is somehow all 'inner.'

There is a similar difficulty besetting the meaning of 'objective' and 'psychic.' There exists apparently a complete subject-object relation between the subject as constituted by 'effort' and the world of ideas, which is described as 'a related whole' (p. 271). Yet there is still another 'extra psychic' world with 'real coefficients' to which the inner 'objective' world of ideas refers and "which holds the entire system [*i. e.*, this 'inner' subject-object system as above described] to its original moorings." "The system is experience and my experience, but the experiences mean existences and the ideas mean things" (p. 262). As above in the case of the 'inner' so here there are apparently two subject-object relationships: one between the inner subject as 'effort and its ideas'; the other between, either these ideas and the things they 'mean' or between this whole 'inner' subject-object 'system' and the world of things.

Doubtless some of these perplexities represent, as usual, the reviewer's 'personal equation' and some may disappear in the other volumes. At all events, as was said in the beginning, the significance of the aim, the standpoint and general method of the treatment, together with the suggestive special features mentioned and others unmentioned, make the work a notable one. A. W. MOORE.

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TRUTH.

The Ambiguity of Truth. F. C. S. SCHILLER. Mind, N. S., 1906, XV., 161-176.

The aim of this article is stated by Mr. Schiller in his first sentence: "To bring to a clear issue the conflict of opinion as to the nature of the conception of 'truth.'" From a preliminary analysis it appears that 'truth' is a habit peculiar to man, and that the conception of 'truth' is allied to that of the 'good' and of the 'beautiful.' Further, it becomes evident that by 'truth' is meant the totality of

truths which, while deceptively claiming to be true, are often false. This leaves us with an important ambiguity, for inasmuch as a claim to truth is inherent in every assertion as such, 'truth' comes to mean both the formal unverified claim and the claim which has stood the test of validation. How may we discriminate between the unsupported claim and the accepted truth? The answer to this question is gained, not from intellectualistic or formal logic, but from an inquiry into the formation of sciences, the making of truth. Each science has its specific subject-matter and method. Moreover, the *purpose* constituting that science, what we want to know from it, determines the relevancy of the answers to our questions. The 'true' answer promotes the purpose, the 'false' thwarts it. Thus 'truth' is a form of value, and has reference to a defined purpose. 'Objective' truth is guaranteed by the arbitrament of society, and by the natural tendency to subordinate all purposes to the Supreme Good. Pragmatism gives us the criterion of evaluating truth when it states that in all knowing the *consequences* of an assertion stamp it as 'true' or 'false.' That, therefore, the 'true' must be the 'good,' 'useful' and 'practical' is the rationale of pragmatism. This pragmatic view of truth as logical value results in a unification of experience and in a symmetrical classification of the sciences. The article concludes with a twofold challenge to intellectualist logicians: (1) How do they propose to validate a claim to truth and to distinguish such a claim from an established truth? (2) What do they propose, in denying the cogency of the pragmatic method, to substitute as a test?

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MEANING.

Ueber das Verstehen von Worten und Sätzen. CLIFTON C. TAYLOR.
Zeitsch. für Psychol. u. Physiol. d. Sinn., 1905, XL., 225-251.

Dr. Taylor presents us with the results of his experiments on the understanding of words. Some new points are well brought out and it is these which I wish to emphasize. By presenting a series of tests, and by studying carefully the introspective evidence as offered by the subjects, he found the following:

I. For the understanding of perceptual sentences (sentences representing perceptual objects), a series of perceptual images is all that is necessary (p. 235).

II. This facilitation of the understanding of perceptual sentences by means of perceptual images is lessened when the objects represented by the sentences are already known (p. 236).

III. The understanding of abstract sentences is arrested by the presence of perceptual images (p. 239).

IV. The images present in the understanding of a text are fewer when the objects mentioned in the text are more numerous (p. 241).

V. Grammatical construction may operate as a hindrance in the understanding of a sentence (p. 245).

VI. The more common the text is, the less filled is the content of the thought moment (p. 246).

VII. Certain pauses seem to be necessary in the understanding of sentences.

VIII. The connectives in the sentences seem to facilitate understanding without any special experience which can be analyzed out of the conscious moment as being concomitant with such connectives. They seem to function without a definite content.

FELIX ARNOLD.

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ÆSTHETICS.

Essais d'esthétique empirique. VERNON LEE. *Revue Philosophique*, 1905, LIX., 46-60, 133-146.

The author's purpose is to recount her own æsthetic evolution, to suggest to others the problems and hypotheses incident to her own investigations, and to offer a method of research. The author makes application to æsthetics of the methods of individual and empirical psychology. These articles consist substantially of notes taken in various museums of painting and sculpture from April 15, 1901, to May 20, 1904, by herself and two of her pupils, all three differing in race, age and education.

Vernon Lee's own notes show her chief problems to have been (1) how one goes about studying a statue, how one follows its lines and plan; (2) the nature of our reaction to statues good or bad; (3) finally, what associations and sentiments are revived or imitated thereby. Her earlier observations were based on Greek statuary. She attached little importance to the internal imitation of the pose of the statue. Such a tendency is due to one's completing very rapidly an imperfect visual impression by means of the experiences stored up within ourselves. Persons who pay little attention to the form as such (lines, plan), seem more sensible of the dramatic, emotional expressiveness of the work. Consider, for example, that idea with reference to the 'Laocoön.' The author's experience before the Niobe of Subiaco, the Apoxyomenos of Leyuppis, the Amazon of Polyclitus,

and the Satyr of Praxiteles, besides others of like superiority, lead the author to conclude that only statues of inferior quality arouse in us an imitative tendency. On the other hand that tendency is strongly aroused by statues of the second rank. It is their peculiarity of appearing to be actively occupied that renders them so disquieting, and prevents us from fixing our attention on them. Their action becomes painful because it is never completed, whereas our mimetic faculty demands the second moment of action. The movement that we attribute to such examples as the Doryphorus and the Apoxyomenos is purely that of lines which ascend, widen, and support while we remain calm before them, or which change according as we move around the statue.

The power that every plastic form representative of the human form possesses of awakening in us every kind of sentiment that we experience before the human reality is due to the revival of images saturated with the purely human emotions that have accompanied the sight of the human reality. That emotion of human quality, as distinguished from the æsthetic emotion as such, will be in inverse proportion to the attention that we give the plastic work in itself. In the normal state, the perception of the form is probably a subconscious process accompanying the very conscious process of discovering either the thing represented by that form, or the use of the object possessing that form. From the psychical fusion that takes place results a difficulty of giving an account of the form, and a facility for giving an account of the subject of the work.

Several notable differences between art and nature are stated. (1) In a museum the visual stimulus is an object possessing an 'accent' much more definite and vigorous than the 'natural objects' possess. That accounts for the detachment of works of art from their surroundings. (2) The relationship that exists between figures in art and their surroundings practically does not exist in real life. In the latter case those different elements are bound together by a judgment of our experience, by the logical relationship; whereas in the former case they are bound together by an æsthetic affinity by the proper interaction of forces. (3) The artist turns natural forms into conventional form. Hence arises the theory of an artist's 'line' so-called, *e. g.*, the 'line' of Leonardo or of Botticelli.

The unexpected pleasure derived by the writer from a picture of Angelico's, hitherto unknown to her, and the disagreeable impression caused by another picture of the same artist's, this one well-known to the writer, gave rise to the question whether other activities than the

æsthetic are implied in the appreciation of artistic form. The writer believes that the action of the new on the æsthetic sentiment is due to the putting in motion of our activity of exploration. It is possible that the maximum of appreciation may be reached by the 'unexpected recognition of a thing already familiar.' In such a case we investigate at the same time that we synthesize, whereas when the object and its nature are unknown, there is a movement of exploration but not of synthesis. If the work of art furnishes our activities with only one element, the other interests, however trifling, existing in our lives will offer more or less resistance to the æsthetic interest. The action of art is not hypnotic and mono-ideistic; it is in the highest degree synthetic. Though in fact the first function of art is to 'exclude,' that function is performed by art's enclosing of the attention in a very complex and complete labyrinth where all our activities cross and re-cross without isolating and avoiding each other.

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IDEALS.

The Genesis of Ideals. ARTHUR ERNEST DAVIES. Jour. of Phil., Psych. and Sci. Meth., 1906, VIII., 482-495.

Before treating of the development of ideals, Mr. Davies shows the confusion existing in the naturalistic and the theological treatment. "With the one, the ideal has an objective character, an existence outside the individual consciousness, to which the individual consciousness may approach, but which it may not comprehend" (p. 483). But this places the ideal beyond the life of men. "With the other, the ideal must find its place within the experience of those in whom it is operative, but then it is no longer an ideal, but just a bit of the common experience of common men. On this view, the only improvement is self-improvement" (p. 483).

Mr. Davies then makes an effort to find the actual state of affairs by attempting to improve Professor Baldwin's theory of imitation. Imitation does not, so says Mr. Davies, account for the phenomena of differentiation in social organization. Imitation is always a reproductive affair (p. 485). Mr. Davies works out symbolically this idea of change as follows: "There is, as we conceive it, a contrast between a presented content *B*—the person who is doing the unusual thing—and a represented content *a*—the person who usually does what is now being done—mediated through the act of undressing, etc.—*xyz*. What is getting done—*xyz*—calls up the image of *A*—*a*—

which fails to get verified in the child's experience through the presence of *B*. Or, to put it another way, and at the same time to emphasize another aspect of the case, *B* arouses the expectation *pqr* which fails to get realized through the substitution of *xyz*. But *xyz* calls up *a*, and thereby throws into conflict, by the meaning each has come to have in experience, two previously emphasized points of the environment *A* and *B*. These, as we understand, are the conditions under which on the basis of imitation both intellectual and moral development normally takes place. Intellectually, the problem means that the judgments of value, *B* is *pqr* and *A* is *xyz*, must give place to a higher synthesis through which *pqr* and *xyz* may both serve as predicates qualifying the same subject *B*. Morally, the same situation may be interpreted as one of allowing, through growth in mental faculty, an ideal element — *a* — to serve as a reconstructive factor in behavior in the given relation *B* — *pqr*" (p. 488).

All this is quite correct and, barring its symbolical dress, well put. But does it really differ much from Baldwin's statements as seen throughout his *Social and Ethical Interpretations*? I need cite only one to show the similarity.

"We may say that each of the situations which arises from his effort to reproduce the copy *is an invention of the child's*. It is so because he works it out; no one else in the world knows it or can reproduce it. He aims, it is true, not at anything new; he aims at the thing the copy set for him to imitate. But what he does differs both from this and from anything he has ever done before. It is a synthesis of old material, of his old pictures of finger-movements, in this case, with the new picture presented to his eye, and his old strains of muscle, shortness of breath, rushing of blood, setting of glottis, bending of joints, etc. But the outcome — that is new. . . . He has a new thing to contemplate and he is withal a new person to contemplate it."¹ This statement is but one of many.

As regards the function of the ideal in life, Mr. Davies brings out well the contrast between the static view of Hume, and the functional view. From the naturalistic view of Hume, the ideal can only be a content of consciousness, and so can have no functional value. But we must consider the ideal both as a bit of experience and as transcendent. The ideal is transcendent in that it is a content qualitatively distinct from the presented material of consciousness. "This difference is indicated by the term — idea — which is used to describe this class of content." (p. 493).

¹ *Social and Ethical Interpretations in Mental Development*, § 65.

So far as we can see from the discussion of Mr. Davies, the point which he wishes to emphasize is that the ideal is a functional transcendent unit, based upon individual experience and differing from such experience. But his interpretation of Baldwin's theory of imitation seems somewhat askew. This, however, by no means interferes with the excellence of his treatment, as such. FELIX ARNOLD.

NEW YORK CITY.

CODE OF HONOR.

The College Woman's Code of Honor. AMY E. TANNER. Ped. Sem., 1906, XIII., Pp. 104-117.

A number of questions regarding what the answerer would do in various situations that are likely to occur and involving petty temptations and fine moral discrimination were given to the young women of several women's colleges and co-educational colleges. The answers from 440 students indicate that one half would condemn keeping carfare uncalled for, using a 'pony,' using a point accidentally seen on another's paper during an examination, and telling stories to a credulous girl, while the rest would defend such action or decide variously according to the exact circumstances of the case. There is little condemnation of 'bluffing' in recitations, telling white lies, exaggerating, or the acceptance of unduly favorable opinions of self. The college girl has a thoroughgoing contempt for sneaking and out and out lying, but with sufficient intelligence and sense of humor in most cases to enjoy any sort of contest with wits even though she risks her scholarly reputation.

Socially she is on the whole warm hearted enough to sacrifice the truth in small matters to the demands of friendship and courtesy, but rarely has she sufficient social sense to undertake the punishment of a wrong doer. The author emphasizes the need of more democracy and self government in school and college. E. A. KIRKPATRICK.

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BOOKS RECEIVED FROM FEBRUARY 5 TO MARCH 5.

Textbook of Psychiatry. E. MENDEL. Trans. by W. C. KRAUSS. Philadelphia, Davis Co., 1907. Pp. xiv + 311.

The Psychology of Public Speaking. W. D. SCOTT. Pearson Bros. (No place or date.) Pp. 222.

- Philosophical Problems in the Light of Vital Organization.* E. MONTGOMERY. New York & London, Putnam, 1907. Pp. 462.
- Structure and Growth of the Mind.* W. MITCHELL. London & New York, Macmillan, 1907. Pp. xxxv + 512.
- Studies and Exercises in Formal Logic.* J. N. KEYNES. (4th ed. rewrit. and enl.) London & New York, Macmillan, 1906.

NOTES AND NEWS.

WE have received the preliminary announcement of an International Congress of Psychiatry, Neurology, Psychology, and Care of the Insane, to be held at Amsterdam, September 2-7. The international coöperating committee includes Dr. G. Alder Blumer, Professor Joseph Jastrow, and Dr. Louise G. Robinowitch from this country. Those desiring to attend the congress are requested to communicate with the general secretaries, Drs. J. Van Deventer Sz. and G. Van Wayenburg, Prinzengracht 717, Amsterdam, enclosing their cards and membership fee (\$4.15). Abstracts of papers should be submitted by May 1.

THE publication of the *Rivista Filosofica* (founded by the late Carlo Cantoni) will be continued by a board consisting of A. Faggi, E. Juvalta, G. Mantovani, G. Vidari, and G. Villa. (Manuscripts and subscriptions to Professor Juvalta, Corso Garibaldi 56, Pavia.)

THE psychological clinic conducted in connection with the laboratory of psychology at the University of Pennsylvania announces a new journal, *The Psychological Clinic*, to be issued monthly excepting July, August, and September, with about 300 pages to the volume, the size and general style being similar to the PSYCHOLOGICAL BULLETIN. (Subsc. \$1, Lightner Witmer, Editor, Station B., Philadelphia.)

American Philosophy—The Early Schools, by Dr. I. Woodbridge Riley, is announced by Dodd, Mead & Co. for immediate publication. It is the first volume of an extended work based on original sources and unpublished documents—the fruit of Dr. Riley's research as Johnston Research Scholar at the Johns Hopkins University.

PROFESSOR JOSIAH ROYCE, of Harvard University, delivered a series of five lectures at the University of Illinois during the last week of January on the topic, 'Loyalty as an Ethical Principle.' During his stay at Urbana, Professor Royce also addressed the Philosophical Club on the topic, 'What Sort of Reality have Mathematical Truths and Ideas?' Professor William James delivered a series of eight

lectures before the department of philosophy and psychology at Columbia University on the topic, 'Pragmatism: a New Name for an Old Way of Thinking.' Professor G. H. Palmer, of the same University, recently delivered a series of lectures at the University of Kansas on 'Theories of Conscience.'

DR. R. P. ANGIER, of the Department of Psychology at Yale, will lecture March 26-29 on the subject 'Some Tendencies in Modern Psychology' at the University of California.

A SERIES of lectures on 'Socialism' was delivered in February by W. H. Mallock, of England, at Columbia University, in coöperation with the Public Lecture Bureau of the National Civic Federation.

THE following are taken from the press:

DR. P. J. MÖBIUS, the author of many works on psychological and pathological topics, died recently at Leipzig at the age of fifty-three years.

DR. ERNST MEUMANN, of Königsberg, has been called to the chair of philosophy at Münster as successor to Professor Busse.

DR. DICKINSON S. MILLER, now lecturer in philosophy, has been made professor of philosophy at Columbia University.

THE EDITORS of the REVIEW announce the completion of arrangements for the issue of a new series of Monographs, planned on the lines of the *Psychological Monograph Series* already issued. The new series will be devoted to philosophical papers, and will bear the title *Philosophical Monographs of the Psychological Review*. The two series will proceed side by side, being devoted to more extended papers on psychological and philosophical topics, respectively. We are glad to offer to authors and university departments this wider channel of publication on the terms heretofore extended in connection with the old series. Manuscripts and correspondence with reference to the printing of Monographs should be addressed as follows:

For the series of *Psychological Monographs*, to
PROFESSOR C. H. JUDD, Yale University, New Haven, Conn.

For the series of *Philosophical Monographs*, to
PROFESSOR J. MARK BALDWIN, Johns Hopkins University,
Baltimore, Md.

THE PSYCHOLOGICAL BULLETIN

UPRIGHT VISION AND THE INVERTED IMAGE.

BY DAVID COYLE,

Princeton University.

The eye-movement theory of upright vision has been taken by some writers as necessitating the inversion of the retinal image. Croom Robertson¹ says: "*If the image were not upside down we should not see the object the right way up.* For in looking up to the top of the pillar our object is to bring the image of the top on to the *lutea macula*, and as the eye is globular, the raising of the cornea in front depresses the *lutea macula* at the back. So that, in fact, if the rays did not cross as they do (thus inverting the image), the raising of the iris would bring the *lutea macula* opposite the rays from the bottom of the pillar." According to Wundt:² "If the position of objects in space is inferred from movement, the retinal image *must* be inverted, since only where this is the case is it possible for the movement to correspond with the actual position of the objects. So far from being a paradox, the inverted retinal image is necessary for vision. The retinal image must have been upside down, even if the laws of the refraction of light in the eye had not rendered the inversion physically necessary." And Stratton³ says: "Upper and lower, according to [the eye-movement] theory, mean positions which require an upward or downward movement of the eye to bring them into clear vision. But an upward movement of the eye brings into clear vision only what lies below the fovea on the retina. So that [on this theory] the perception of objects as upright requires that their retinal images be inverted."

It has been shown experimentally by Professor Stratton⁴ that in-

¹ *Elements of Psychology*, ed. by Rhys Davids; New York, 1896; p. 129; italics as in the original.

² *Lect. on Human and Animal Psychology*, Eng. trans.; London, 1894; p. 164.

³ PSYCHOL. REVIEW, 1896, III., 611.

⁴ PSYCHOL. REVIEW, III., 611 f.; IV., 341 f., 463 f.

version is not necessary for upright vision, and this fact has been used as an argument against the eye-movement theory.¹

Now it can be shown, by a consideration of the optical principle involved, that the assumption of the necessity of the inverted image is erroneous.

In the first place, let us consider a normal eye, with image inverted, as in Fig. 1. Now to bring the image of B on the fovea, f , the eye is turned upward till its axis passes through B , when the image

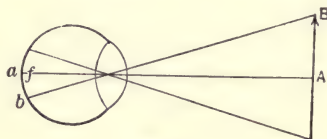


Fig. 1

of B will necessarily fall on f . Since we are not aware of the relative positions of f and b on the retina we do not purposely move f toward b , but by contraction of the proper eye muscles we move the eye so that we will perceive B more and more distinctly. The physical counterpart of this is that b and f are growing nearer each other, which is the necessary and sufficient condition of the impression of increasingly clear vision, *independent of what may happen to be the absolute motion of the eye.*

It only remains to prove that in the cases where b is above f a lifting of the eye will again make b and f approach, even though f actually moves downward. Consider the case of an eye equipped with a set of lenses, as in Fig. 2, which will cause the image on the retina to be upright. Let AB be an object, evidently its image will be in the position ab . Now aA coincides with the axis of the system, and it is evident, since A is the point whose image is at a , *i.e.*, at the fovea, that any point, to be focussed at the fovea, has only to be brought to the position A , or to some other position on the axis of the system. This gives us the following principle for the motion of an eye with the erect image: to bring the image of any point onto the fovea, it is necessary to turn the eye so that the given point is directly in front of the lens. That is, one must turn the eye upward to see high objects, and *vice versa* — exactly as with the inverted image — which is the necessary and sufficient condition of upright vision.

¹ Professor Stratton himself says his experiment "makes the eye-movement doctrine of visual directions of little practical assistance for understanding the harmony between sight and touch." *PSYCHOL. REV.*, IV., p. 481. Cf. his *Experimental Psychology*, p. 146.

Let us consider the case of an eye fitted so as to have an erect image, and whose retina has never been used, and has therefore no retinal local sign associations. Suppose it to be uncovered in a dark room with a point of light on the ceiling. A point on the upper part of the retina will be stimulated, giving the usual reaction in a tendency to movements of the eye. By trial the subject will find that raising the eye will cause the light point to approach and finally to



Fig. 2

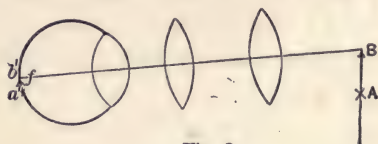


Fig. 3

reach the point of clearest vision. In Fig. 2, as the eye revolves upward the retina moves downward and the image of B moves downward to coincide with the fovea at b' as in Fig. 3. (For the effect of this motion on a retina *accustomed to motion in the opposite direction under these circumstances*, cf. the 'swinging of the field' experienced by Professor Stratton.) It will be seen from the above that a person born with an erect-image eye would have exactly similiar materials for the formation of local sign associations by movements of the eye as one with the inverted image. For, since the system of lenses is supposed rigidly connected with the eyeball, the reasoning holds good also for a system in which the lenses would be inside the eye itself.

PSYCHOLOGICAL LITERATURE.

COLOR-BLINDNESS.

Fortgesetzte Untersuchungen zur Symptomatologie und Diagnostik der angeborenen Störungen des Farbensinns. W. A. NAGEL. *Zeitschrift für Sinnesphysiologie*, 1906, XLI., 239-282, 319-337.

Nagel has been engaged, for upwards of ten years, in the investigation of color blindness; and besides his own researches, much work has been done under his direction by his colleagues at Berlin. A chief purpose of Nagel's endeavor has been to obtain a more accurate diagnosis of the abnormalities of color vision, — the group of phenomena which have come to be known as 'color weakness' receiving particular attention. The results of these many years of painstaking research are summarized in the present paper, which also contains a discussion of the theoretical and practical bearing of the data presented. The paper is a most valuable contribution to the literature of color vision.

The characteristics of 'color weakness' have been investigated in detail by Guttman (*Report of the Giessen Congress, 1904*, p. 15) and by Nagel. A prominent feature of this defect is the uncertainty and confusion which arise when color stimuli are exposed with a small visual angle. Under this and other relatively unfavorable conditions of vision 'color weakness' is found to be identical with anomalous trichromatism (as defined by Koenig). Several thousand cases of 'color weakness' examined by the author contained not a single instance of the defect in pronounced form which did not turn out on closer examination to be anomalous trichromatism. 'Color weakness' is therefore to be regarded as a form of color blindness; it is not a mere reduction of normal color sensitivity, as has so often been supposed. Neither in the literature nor in the testing of color vision for practical purposes has the significance of this defect been recognized. The anomalous trichromate is no less a menace in the railway and marine service than is the dichromate. The navigator or the locomotive engineer is frequently obliged to interpret signals when they subtend small visual angles, when they are partially obscured by fog, and when they appear for but an instant. And these are just the optimal conditions for the confusion of colors on the part of the anoma-

lous trichromate. Nagel is convinced that many wrecks are traceable to this defect of color vision, and more primarily to the defective color testing of employees.

It was inevitable that methods of testing the color sense should be a question of prime importance in Nagel's investigation. And it is here that the author has done most valuable service. Nagel is himself possessed of an anomalous color system (deutanopia), and is for that reason peculiarly fitted for the task of evaluating methods of testing. His experience with the tests hitherto employed convinces him of their utter unreliability, — a conviction which has been shared by numerous other investigators. But the author has gone farther: he has devised and perfected a simple and ingenuous form of test which seems to be free from objection. Indeed, it has won the approval of his colleagues in Germany, and has been adopted by the Prussian minister of railways and by the imperial naval authorities. It is the group of anomalous trichromates which has shown the inadequacy of the tests in current use, although it turns out that the current methods may even fail to detect the presence of dichromatism. Thus, of three hundred railway employees, all of whom had been passed by physicians, Nagel found five per cent. to be typical color blinds. And more surprising still is the result obtained in the examination of 1778 members of the railway regiments who had been detailed for an official determination of the utility of Nagel's method of testing the color sense. All of these men had passed the Holmgren test at least once, and the majority had also been pronounced to be normal by physicians who employed the Stilling test. Yet Nagel's method — employed, as in the case of Holmgren's and Stilling's, by military physicians — revealed the presence of thirteen dichromates and thirty-one anomalous color blinds of various types.

Nagel's test is put upon the market in the form of twenty pseudo-isochromatic plates with detailed instructions for their use. These colored plates are adapted to the detection of all the known forms of color blindness, — each form being revealed by a typical reaction to particular plates. It is of course impossible to give here an intelligible description of the test, nor would it be profitable to attempt such a task save in the presence of the plates themselves. The reviewer cannot too strongly recommend the adoption of this test by psychologists (W. A. Nagel. *Tafeln zur Untersuchung des Farbenunterscheidungsvermögens*. Vierte vermehrte Aufl. Wiesbaden, J. F. Bergmann, 1906.)

Erworbene Tritanopie. COLLIN und W. A. NAGEL. Zeitsch. f. Sinnesphysiol., 1906, XLI., 74-88.

Collin and Nagel describe three interesting cases of acquired abnormality of color vision, two of which they classify as tritanopia (von Kries) or violet-blindness (Helmholtz). The first patient was a student who had received a '*Durchzieher*' in the region of the left eye. The eye-lid had been incised and the orbital wall fractured, but the eye-ball itself had received no external injury. Normal color vision failed to return when the wound was healed, hence the case was submitted to a thorough investigation. Both eyes were found to be emmetropic, and the right was normal in appearance and in function. In the fundus of the left eye there was found a small gray patch in the region of the macula, and in the extreme peripheral region a blood clot, several ruptures of the retinal blood-vessels, and an œdematous condition of the retina, — all due, it is believed, to the wound and fracture. The color sense of this eye was strikingly abnormal, a condition which gradually disappeared with the disappearance of the abnormal condition of the retina. In the early stages of the test the patient reported that yellow-green appeared to be blue, and that yellow (Na-line) seemed pale violet (lilac), when the stimulus color subtended a visual angle of 1.5 degrees or less. These colors were seen normally by the right eye, and binocular regard gave retinal rivalry (yellow and violet). Red was seen normally by the injured eye, excepting that it appeared more saturated than to the normal eye. At about 575-580 $\mu\mu$ the violet (yellow) passed abruptly into blue (green); at this region too was found a narrow band of almost uncolored light. Bluish began at 560 $\mu\mu$, and 'distinctly blue' at 545 $\mu\mu$ (yellow-green to the normal eye); 430 $\mu\mu$ was reported to be dark blue (distinctly violet and brighter to the normal eye). The spectrum was of normal length at the red end, but was very much shortened at the violet end. Two weeks later the pathological condition of the macula was no longer visible; nor was any abnormality of color vision revealed in tests with the long-waved half of the spectrum. But blue (470 $\mu\mu$) seemed greenish blue, and violet seemed blue; the latter stimulus however assumed a violetish tinge with long-continued regard.

The second patient suffered from albumino-uric retinitis with complications. In the early stages of the tests this patient confused yellow and green with gray, but she had no difficulty with red or blue. Nine days later it was found that her previous equations of yellow and green no longer held. Yellowish green in juxtaposition with blue seemed gray; when yellowish green was exposed beside yellow, the former was

called blue and the latter white. Upon a white back-ground yellow and green both seemed blue. Tests made twenty-four days later showed a marked decrease of abnormality of the color system.

The third patient was a workman who suffered from severe headache. The ophthalmoscope showed a temporal bleaching in both eyes; otherwise the fundus was normal. This patient confused blue with green, and yellow with green. Red was invariably recognized. The Nagel plates made up of spots of yellow-green and blue-green were reported to be of a uniform green color. In tests with spectral colors (visual angle of 2° – 3°), yellow green ($570\text{ }\mu\mu$ – $575\text{ }\mu\mu$) was called white, gray or yellow; violet ($430\text{ }\mu\mu$ to end of spectrum) had no distinctive color. The paper closes with a discussion of the results obtained in these tests.

Ein Fall von Grünblindheit (Deuteranopie) mit ungewöhnlichen Komplikationen. ALFRED GUTTMANN. Zeitsch. f. Sinnesphysiol., 1906, XLI., 45–53.

This case had been tested repeatedly 'by different methods' and pronounced normal. The Nagel test however showed the presence of an abnormal color system, and a thorough investigation was undertaken. The Helmholtz color-mixing apparatus was arranged to show a semi-circle of red ($670\text{ }\mu\mu$), and a semi-circle of yellow ($590\text{ }\mu\mu$); the patient reported that he saw a uniformly colored yellow disc. (It is not clear why this case should be called *Deuteranopia* rather than *Protanopia*.) A somewhat similar confusion seems to have been obtained with red and green light ($670\text{ }\mu\mu$ and $535\text{ }\mu\mu$). In tests with pigments, a mixture of 8° blue and 352° black-white proved to be indistinguishable from a mixture of 49° of the same blue and 311° of black-white. Nor could the patient distinguish between mixtures of 12° blue + 348° black-white and 50° yellow + 310° black-white. Yet he was not blue-blind; it would appear from the author's statement that blue and yellow stimuli were confused only when presented in relatively slight degrees of saturation. Another striking feature of the abnormality was the sub-normal sensitivity to differences of brightness in colored and uncolored stimuli. Patches of spectral red ($670\text{ }\mu\mu$) were exposed, and while one remained constant in brightness the other was varied until the judgment 'brighter' or 'darker' was reached. It was found that the width of the slit could be varied between limits represented by the units 20 and 40 without any perceptible change of brightness; for the normal subject the corresponding readings were 25 and 26. Yellow ($589\text{ }\mu\mu$) gave limits of 17–31 for the abnormal and

19-21 for the normal subject; green ($535 \mu\mu$) 19-35 for the abnormal and 22-24 for the normal; blue ($460 \mu\mu$) 40-111 for the abnormal and 61-63 for the normal. This case, then, is characterized by a lack of red-green sensation, and by a reduced sensitivity to yellow-blue and to brightness.

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FUNCTION OF THE EAR.

Die akustische Function der lufthaltenden Hohlräume des Ohres.

F. KRETSCHMANN. Archiv f. d. ges. Physiologie (Pflüger's), 1905, CVIII., 499-536.

The extensive system of pneumatic cavities formed by the tympanum, the mastoid antrum and the numerous cells about the bony labyrinth constitute a resonance-chamber by means of which sounds otherwise too feeble to be detected are rendered audible. This is demonstrated by an ingenious series of experiments with resonators, auscultation tubes and specially prepared acoustical apparatus. The importance of the spongy structure of the bony walls is shown by filling a resonator with bits of porous coke which damp the fundamental tone of the resonator without decreasing the response to sounds of other pitch. Change of tension of the tympanic membrane is shown to aid in damping fundamental tones, in protecting the inner ear against violent sounds and in accommodating for very weak sounds and for extremes of pitch. The superiority of the bow-shaped arrangement of the chain of ossicles, as compared with the straight columella of the bird-ear, consists in making possible this change of tension. Sound vibrations are transmitted to the labyrinth, not only by way of the ossicles and the oval window, but also through the round window and through the bony capsule. These auxiliary paths could not function efficiently without the system of pneumatic cavities.

The reviewer has been led to question this last conclusion through some tests which have recently been made in the Chicago laboratory upon a subject whose hearing is fairly good, despite the fact that the drum membrane and the ossicles have been removed from both ears. Dr. Kretschmann's description of the function of the chain of ossicles seems to be wholly admirable, as well as his insistence upon the importance of the two secondary conduction paths, which receive scant treatment in the ordinary accounts of hearing.

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ATTENTION.

Physiological Factors of the Attention Process. W. McDougall. Mind, 1906, XV., 329-359.

Ueber die Intensitätsänderungen schwacher Geräusche. W. HEINRICH. Zeitschr. f. Sinnesphysiol., 1906, XLI., 57-58.

Ueber das periodische Verschwinden kleiner Punkte. W. HEINRICH und L. CHWISTEK. Zeitschr. f. Sinnesphysiol., 1906, XLI., 59-73.

The paper by McDougall is the last of a series, the three preceding numbers of which appeared in the same journal in July, 1902, and July and October, 1903. In this paper McDougall supports the theory that the important conditions of maintenance and change of attention are cerebral, and the part played by motor adjustment is secondary. Three types of condition are noted: (1) *External*, including intensity, novelty, suddenness, contrast, etc., of the stimulus. (2) *Accessory internal*, including amount of free nervous energy in the brain, which depends on the afferent currents, principally the visceral; and adjustment of sense organs, which directly favors stimulus reception as well as adds to the afferent current; these are rather effects of attention direction which support and maintain it. (3) *Intrinsic* conditions, *i. e.*, the varying states of the higher-level systems.

The factors determining the intrinsic conditions, *i. e.*, deciding which higher-levels shall function at any time, are detailed: (a) Excitement of the system by expectation or concomitant reinforcement, as in voluntary attention (volition in general), or by residual activity, or by afferent nerve currents set up by discharges to the viscera by the same higher system; a circular process (emotional interest). (b) Inhibition of other systems by the one functioning. For this McDougall adopts James' 'drainage' theory as being simplest, since it also explains association. (c) Fatigue of the systems, leading to temporary lapse of activity and allowing another system to become active. Fluctuation of attention in general is ascribed to cerebral fatigue. Even in the case of minimal stimulations the sense-organ changes are results rather than causes.

The vascular changes McDougall considers of no importance, since any one system of neurones is supplied by many parts of the vascular system and, conversely, each vascular system supplies many neurone systems.

The experimental evidence adduced by McDougall is principally

derived from reversible spatial percepts and retinal rivalry. As against the importance of motor adjustment, he cites the changes in perspective with unipunctual fixation and attention, and with accommodation changes contrary to the normal direction; the grouping of double-rowing white dots in percept or after-image in rows either with or contrary to eye movements, or with constant fixation; and the voluntary lengthening of either phase in any fluctuating percept or image.

The importance of the *intrinsic* factor is shown (1) by constancy of reversible figure until another position is suggested to observer; (2) by voluntary control of fluctuations; and (3) by the fact that after-images appear in whichever phase you think of at the moment of appearance. In case of white dots, the after-images may appear irregularly unless voluntarily grouped in rows, in which case they appear and disappear by rows. With red and blue groups of dots viewed stereoscopically, either field may be retained longer by attending to alternate groupings in that color. In this connection three interesting cases of alleged cerebral induction of light and color are detailed. These have, however, only indirect bearing on the theme.

The effects of fatigue. Unusual length of one phase of an alternation percept, produced by voluntary effort or by mechanical means (as closing one eye or introducing movement in one field in retinal rivalry, or introducing binocular factors in the 'windmill' illusion) is always followed by unusual length of the opposite phase when the inhibiting conditions are removed.

At the conclusion, McDougall admits that a thoroughgoing physical explanation does not really satisfy him. In all attention there is a convergence of the energy from all or many parts of the brain into one neural system. In voluntary attention there is still further concentration, and at this point, he thinks, there may be a 'psychical guidance of physical processes.'

Heinrich offers an explanation for the fact, alleged by him in earlier papers, that some observers fail to detect fluctuations in minimal tones or clangs when these are free from 'noise.' In the case of tones or clangs which contained noise, Heinrich reports in the present paper that the one subject found the tones to remain constant, and the noise to vary.

The tympanic membrane, according to Heinrich, requires especially fine tuning for weak noises. Reaction of the membrane to tones may be observed even when the tension is slightly changed from the proper correspondant to the tone, but with noise the membrane is astonishingly

indifferent unless exactly tuned. The fluctuations of minimal noises is therefore explained as due to periodic variations in the tension of the tensor tympani, which do not affect the perception of tones. This theory seems premature, in view of the fact that there are many possible reasons why some may fail to observe fluctuations in 'pure' tones while others do observe them.

Hammer's explanation of fluctuation as due to objective causes Heinrich offsets by experiments on four persons with the same clock. The tests apparently were not simultaneous. He finds that the fluctuation period is different for each person, and is variable for each, whereas he assumes that if the fluctuation were due to physical variations in the sound of the clock they would be regular and the same for each person, since the revolutions of the wheels are regularly repeated. This assumption seems to the reviewer to be rather uncritical, not taking account of the fact that the irregularities, if such exist, are due not to irregularities of *one* wheel, but of several wheels revolving at different rates, so that the cycle of the relatively pronounced irregularities is apt to be highly complicated and may take several hours to complete itself. The experiment must therefore be regarded as irrelevant.

The experiments of Heinrich and Chwistek are based on an earlier statement of Heinrich's that the disappearance of small, sharply fixated points is due to fluctuations in the crystalline lens. In the first experiments the patients, two in number, and with normal vision, fixated black points on light ground, recording (on kymograph) appearance and disappearance by pressure on a rubber bulb. The experimenter, viewing through an ophthalmometer the images of a light reflected to the lens of the patient's eye by two mirrors, was able to note slight changes in curvature of the lens, and record them by another bulb, along with the patient's record. It was found that the disappearance of the point in most cases coincided with a change in the lens. In a few cases there were changes without disappearance, and *vice versa*. There was no question of fatigue, for the changes in the lens commenced with the fixation.

In the second and fourth experiments upon three subjects, with different means of registration, and chronometer record, it was found that with increasing size of the black spots there was increasing length of the fluctuation period, and relative lengthening of the period of visibility. This is in accord with the assumption that the larger variations in the lens are the less frequent. It was also found that with darkening of the background there was shortening of the fluctuation period, with relative shortening of the phase of visibility. Tables

showing averages and mean variations are given for both these experiments, but the number of tests on which the averages are based is not stated. Optical diagrams showing how lens-changes could produce the fluctuations are also given. Two of these patients were myopic. The third experiment, made on these, showed that with two adjacent spots beyond the range of clear vision there was a periodic increase in distinctness, shown by the separation of the two spots which otherwise fused into one. The authors very properly do not claim that these experiments demonstrate the dependence of the fluctuations on changes in the lens, but only that the two are synchronous processes.

KNIGHT DUNLAP.

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Untersuchungen über das periphere Sehen: Ein Beitrag zur Psychologie der Aufmerksamkeit. STANISLAW LORIA. Zeitsch. f. Psychol. u. Physiol. d. Sinn., 1905, XL., 160-186.

In an investigation of vision with instantaneous illumination, Helmholtz (*Physiol. Optik*, 1866, 471 f.) found that at the instant when the spark appears, the observer obtains a distinct impression of only that part of the field towards which the attention is for the moment directed. He reported too that, while preserving a constant fixation, one may direct one's attention at will to any region of the paraxial field. These and similar results of that period supported the assumption that the attention is a purely central function whose direction is independent of any motor mechanism. And numerous writers have accepted the principle that a mere effort of will — without the coöperation of any motor adjustment whatever — suffices to bring to the focus of consciousness whatever part of the content one may choose to select for attentive examination. Professor Heinrich's investigation of the phenomena of attention led him to dispute the validity of this principle. This author showed that while it is unquestionably true that different regions of the visual field may be attended to without change of fixation, yet these shiftings of attention are accompanied by variations in lenticular adjustment (*Zeitschrift*, IX. and XI.). Heinrich's measurements, however, were confined to certain circumscribed regions of the lateral field of vision, and, too, his investigation failed to determine whether paraxial accommodation is accurate or approximate only. Hence Loria has been led, at the investigation of Heinrich himself, to pursue the investigation farther.

Loria undertakes to determine what is the relative influence of the distance of the fixation-point, and of the position of the lateral object, in initiating an adjustment of accommodation when the attention is

turned to the paraxial object; he undertakes also to measure the range of paraxial accommodation for constant positions of the fixation-point, *i. e.*, to determine the locations of the near-points and the far-points of accommodation upon various radii of the visual field. His apparatus was a perimeter whose fixation-point and stimulus object were adjustable in distance from the eye. And his method consisted essentially in determining, for different radii of the horizontal plane of the visual field, the limits within which the distinct vision of a minute lateral object is possible without variation of fixation. Thus, with the fixation-point at a constant distance, the momentary far-point and near-point of paraxial vision were determined upon radii representing degrees of excentricity varying from 10° to 50° . These measurements were made for various degrees of contraction of the ciliary muscle in the atropinized and in the normal eye. Loria's results confirm and supplement the findings of Heinrich. The lenticular adjustment changes when the attention is directed from the axial to the paraxial regions of the field of vision — notwithstanding the fact that the fixation upon an axial point remains constant throughout. The magnitude of this accommodative change varies with the variation in the excentric direction of attention; the line of paraxial accommodation not only shortens, but its location progressively approaches the eye in proportion as more lateral regions of the field are reached — the normal eye being myopic in excentric vision. And in indirect vision the lenticular adjustment is determined, not by the distance of the fixation-point, but by the position of the paraxial object of attention — the region within which the paraxial object is seen distinctly being wholly independent of the distance of the fixation-point from the eye. Thus, for an emmetropic eye, the distance of the momentary far-point varies progressively from 100 cm., when the paraxial object is 10° from the visual axis, to 20 cm., when the object is 50° from the visual axis; the shifting in the position of the near-point is inconsiderable. The exploration of a certain radius (30° from the visual axis) of the visual field shows the region of clearest vision to be 12 cm. from the eye when the fixation-point is 120 cm. distant, but when the fixation-point is brought in to 65 cm., the region of most distinct vision remains practically unchanged, at 11 cm. Loria describes an interesting experiment which deals with the simultaneous vision of various paraxial objects. He finds that when a number of objects are exposed simultaneously at different momentary points of clearest paraxial vision, they are seen simultaneously in maximal clearness. The paper closes with a discussion of the bearing of his findings upon theories of attention.

MEMORY AND ASSOCIATION.

Merkfähigkeit, Gedächtniss und Assoziation. Ein Beitrag zur Psychologie des Gedächtnisses auf Grund von Untersuchungen Schwachsinniger. KURT GOLDSTEIN. Zeitschr. f. Psych., 1906, XLI., 38-47, 117-144.

Convinced that a consideration of pathological changes in intellectual capacity, such as those exhibited in imbecility, may be of value to normal psychology, our author has made a number of psychological experiments upon patients suffering from various forms of weak-mindedness. He declares his investigations to differ from those of the Kraepelin school in that they relate, not so much to single portions of the psychical personality, as to a comparison between single primary defects and the remaining psychical status. His present report is limited to the results of certain investigations concerning memory and its relation to association.

The experiments consisted in a series of tests of (1) memory and (2) associative ability. Under (1) the capacity for retaining new impressions is distinguished from the virtual memory test of reproducing knowledge acquired in youth. The effect of distracting stimuli introduced during the interval between the impression and the reproduction was also tested. Under (2) tests were made of associations already at the patient's command; also tests of capacity for acquiring new associations. The patients were all women, and imbeciles; three congenital, one paralytic, one epileptic and two senile.

The results lead the author to distinguish between memory in stricter sense, and capacity for noting (*Merkfähigkeit*). Though both involve the processes of simple impression and association between the things noted, yet the two are not at all made use of in equal measure. Real memorizing depends upon association, whereas a mere capacity to note depends most largely upon impressibility (*Einprägungsfähigkeit*). When a considerable time interval separates the noting and the test by reproduction, association tends to aid the reproduction. But when the interval is short, it rather hinders than helps. The shorter the interval, the more important is the simple impression, and the more distracting the intervention of associations. The longer the interval, the less important is impressibility as an aid to associative activity.

The capacity for associating things noted belongs to the general mechanism of association. Impressibility, however, is independent

therefrom. Consequently the two may appear in contrary degrees in the same individual. Congenital imbecility is characterized by a well developed impressibility, but marked deficiency in powers of association. Acquired imbecility is characterized by a tolerable capacity of association, but slight impressibility. The latter class may retain knowledge fairly well, although the capacity for noting is minimal. With the former class capacity for noting may be quite good with respect to retention for brief intervals, although the matter is never fully understood.

The acquisition of knowledge depends upon both impressibility and a capacity for associating things noted. Still, these capacities do not necessarily lead to the acquisition of knowledge. In such acquisition apperception plays an important part. The chief defect of congenital imbecility may, therefore, be referred to deficiency of apperceptive ability as conditioning the incapacity of association.

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Immediate Memory in School Children. W. H. WINCH. British J. of Psychol., 1906, II., 53.

The author has performed a series of experiments with the following questions in view: "1. Whether pure memory, that is memory of percepts associated only in time and space, is improvable by practice. 2. Whether such memory tends to improve as children rise in age and standard in school studies. 3. Whether such memory has any relation to general intellectual proficiency as measured by the position of children within their classes."

The experiments were performed on students selected from the classes of a London girls' school, by the following method: Sets of consonants, twelve for each exercise, were called out, each series being twice given and the two repetitions occupying 25 seconds. The children were allowed one minute 35 seconds to reproduce this in writing. Three such series were given with intervening periods of exactly a week. After a month's interval, necessitated by the Christmas holidays, a fourth set was given, and exactly a week later the final list.

The results show: "1. A marked and almost invariable improvement, slightly interrupted in some cases by the interval of holiday. 2. School proficiency, as measured by age and standard and position in school, appears to be generally accompanied by good memory of the kind we are here testing, though not invariably so. 3. That when the comparison is narrowed down to children of the same grade or

standard, it is still found that memory is positively related to position in school, though, as we should expect, with less exactitude than when a wider range of age and standard of school proficiency is taken for comparison."

The author adds a table of numerical results, showing the comparison between memory and general proficiency.

Rückwirkung sprachlicher Perseveration auf den Associationsvorgang. A. PICK. Zeitschrift für Psychologie, 1906, XLII., 241-257.

The author proposes to investigate the certainty and extent of reaction of the persistence of the vocal motor activity involved in speaking certain words, upon the associative activities of the mind.

After calling attention to the well known influence of bodily position upon the contents of consciousness in pathological and child psychology, and observing that such phenomena are not unknown to normal adult psychology, he proceeds to give full accounts of his observations and experiments upon two pathological cases, the one an epileptic of thirty years' standing, the other a man recovering from convulsions.

Both cases when examined were in a state of dim half-consciousness in which they were abnormally sensitive to suggestion. In the case of the epileptic woman the ideas *match* and *candle* were suggested until they were firmly fixed in her mind. A piece of bread was then given her, and she was asked what it was. She replied 'a match,' and then persisted in using it as a match. When a crumb of it was put into her mouth she rejected it with signs of nausea. A cup which was given to her without her naming it was treated at first as a match but immediately afterward put to its proper use.

That an objectively false presentation is rendered decidedly more persistent by the utterance of the name of the object for which the one presented is mistaken, is the conclusion drawn from a long series of similar tests applied to both subjects. In the case of the man recovering from convulsions a mixture of the idea of the thing vocally named with that of the actual object presented and with other ideas vividly present in the mind was observed. This was shown by a resulting confusion both in speech and action, but the preponderating factor was always the idea associated with the words spoken by the subject.

The author concludes that, since all the factors of pathological psychology differ from those of the normal in relative intensity and

prominence alone, and not in their intrinsic nature, the question of the influence of the persistence of speech-activity as a factor in normal psychology is one which deserves attention. The author is to continue the subject in a later issue.

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Studien über die experimentelle Beeinflussung des Vorstellungsverlaufs. MAX LEVY. Part I. Zeitschrift für Psychologie, 1906, XLII., 128-161.

Dr. Max Levy presents in this article a study in association based on observations made upon patients in an insane asylum, making use of the well known fact that in several forms of insanity patients react to a word they may hear — even though it may not be addressed to them. Spontaneously they pour forth a stream of utterances for which the given word seems to have been the stimulus.

Before giving his results Dr. Levy criticizes the common method of experiments on association. (1) When a subject is told to speak out whatever words occur to him in response to a given one that serves as a stimulus, he is placed in a situation utterly unknown in his normal life. We are trained and accustomed to make a selection between the different possibilities of reaction and not to follow any association that may arise without consideration. (2) Besides we are not accustomed to react to an isolated word without any kind of purpose in view. Hence it would appear that the normal flow of thought is very different from that secured in the experiments on association.

In the classification of associations writers have been somewhat arbitrary — following logical divisions rather than psychological facts. For example, one cannot tell from two words alone whether or not the association between them is based upon their meaning or the custom of having seen two things always together.

The author calls attention also to the different effect that one and the same word may have when spoken to the same person on different occasions or to different people.

The first part of the study is brought to a close with a consideration of what the author, following Ziehen, terms the 'constellation' of an idea. This is a factor that helps to bring an idea into consciousness as well as the three other factors of its 'associated relationship,' its 'tone of feeling' and its 'clearness.' The 'constellation' of an idea is its relation to all the ideas and feelings with which it has ever been connected. It embraces the influences of environment, the circum-

stances of childhood, of our occupation, etc. The attempt is then made to prove the influence of the 'constellation' by a rather limited number of experiments on insane patients.

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Experimentell-psychologische Untersuchungen über das Denken.

AUGUST MESSER. Arch. f. d. ges. Psychol., 1906, VIII., 1-224.

A very full and thorough investigation into the nature and process of thought is presented by Herr Messer in his experimental research. In addition to original interpretation, he gives us the statements of the subjects themselves wherever necessary, besides acknowledging the work of Watt, Münsterberg, Binet, Lipps, Meinong, and a number of others, psychologists and logicians, who have worked in this field.

The author's method of procedure was as follows: Fourteen series of tests were given. In the first, the subject was given a printed word visually, upon the understanding of which he was asked to give the first word arising. The stimuli were 143 one and two syllabled substantives, representing objects of a concrete kind. In the second series the subject was asked to name a coördinated object. In the third series he was asked to give a coördinated concept. Seventy-one words of series one were used in series two and three. In the fourth series, the subject was asked to name any adjective; in the fifth, a characteristic of the concept represented by the word; in the sixth, an object symbolized by a subordinate concept. In series 7-11 the stimuli were either paired words or four or five syllabled words. In the seventh, the subject was asked to give the relation between the concepts represented by the words paired; in the eighth, the relation between the objects symbolized by the words. In the ninth series, the stimuli were paired familiar proper names (of philosophers, artists, statesmen, etc.), which were to be compared, the object of this test being to get a judgment of objective value. In the tenth, similar names of persons, things, etc., were given in pairs, of which the subject was to judge which was preferable, the object being to get a judgment of subjective value. In the eleventh series, names and adjectives were paired. The subject was requested to apprehend them either as assertions or as interrogations, to take an attitude towards them and if possible to pass a judgment on them. In the twelfth series, a number of sentences or word groups were suddenly presented, upon which the subject was to take an attitude towards them, and to understand the meaning involved. In the thirteenth series, objects or pictures were

presented and the subject was asked to give the words arising. In the fourteenth, the subject was asked to make some statement concerning these objects and pictures. Reaction times were taken, and full introspection was expressed by the subjects.

In all these tests, one good feature was this: The subject stated freely what he actually experienced in the processes undergone in the various tests. 'What did you experience? What experience did you undergo?' was emphasized in all the series. And these full statements as given by the subjects are reproduced by Herr Messer in full throughout the pages of his most excellent work. I shall make no attempt to give all the results, or even any small part of them. I shall try simply to indicate the more important features brought out by the author.

Herr Messer finds that of the concomitant images, the visual predominate as guiding agencies, though they are of little account in the actual apprehension of meaning. These visual images seem to rise spontaneously and call for little comment on the part of the subjects. Where an image is at first dim, in the process of explaining the process involved in the test, such image becomes more clear and distinct. Concerning the motor concomitants, it seems that the subjects often were unable to say whether the experience was an actual motor idea, or simply a motor impression. But motor elements were decidedly present.

The connection between the associated words seems to be one of meaning, though at times association by sound seems to have operated. In the consciousness of the meaning of the words, there seem to be two forms of apprehension. In the one there is simply an unanalysable understanding of the words, in the other there is a more determinate apprehension of the meaning. In the latter case we have a certain, specific consciousness of particular valuation, more or less definitely localized. In no single instance does the author find that visual images aided in the apprehension of meaning, as such, though such images were of use in guidance.

Where a word seemed to have several meanings, Herr Messer found the following possibilities:

1. There seems to be a consciousness of meaning in general.
2. There seems to be a consciousness of ambiguity.
3. Sometimes a less common meaning arose, while the more common meaning was passed by.
4. Where two meanings are apprehended, they may be:
 - A. Concomitant.
 - a. Both being present, with one more to the background, the other more dominant.

- b. With a conflict between the two resulting in a kind of fluctuation.
 B. Successive.
5. Three or more meanings may be cognized either simultaneously or successively.

On the basis of the results of the various tests, Herr Messer classifies judgments from a psychological point of view as follows :

- I. According to content.
 - (1) Affirmative and negative.
 - (2) Analytic and synthetic.
 - (3) General and particular.
- II. According to their relations to other judgments.
 - (1) New or reproduced.
 - (2) Complete or abridged (copula omitted).
 - (3) Immediate or mediate.
- III. According to the manner of presentation.
 - (1) Perceptual or ideational.
- IV. According to their relations to the subject judging.
 - (1) Theoretical or practical.
 - (2) Original or imitated.
 - (3) Certain or uncertain.

The author then proceeds to characterize particular and general thinking. The former is marked by a certain external directness, a consciousness of reality, a concomitant visual idea or image, and a limitation to some specific concrete situation. The latter is marked by a lack of definite external determination, a lack of persistent visual imagery, by the predominance of the content and meaning of the representative words, by the increased importance of the word, and by a simpler, more gliding and mechanical process.

In addition to such aspects as relate to thought proper, the author also discusses psychic causality, the psychology of volition, and the psychology of individual differences. Altogether, the investigation is a remarkable piece of work. Even should the reader disagree with some of the conclusions, the complete data are there before him for his own interpretation.

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ILLUSIONS.

Ueber einige geometrisch-optische Täuschungen. F. KIESOW.
 Arch. f. d. ges. Psych., 1905, VI., 289-305.

Ein Beitrag zur Kenntnis der variablen geometrisch-optischen Streckentäuschungen. LUIGI BOTTI. Ibid., 306-315.

The general point of these two papers lies in the renewed advocacy of the eye-movement theory of geometrical optical illusions and in the

presentation of fresh evidence in support of the theory. Both of the papers are confessedly preliminary, and both fact and theory are presented with scant regard for similar investigations in the same field. The figures examined are in all cases simple linear magnitudes. In the first paper the procedure is uniformly this. The standard line is a free horizontal from 15 mm. to 25 mm. in length. This is brought into comparison with an objectively equal line furnished with simple accessories which serve either to bound it or to form motives for illusory effects. No exact quantitative determinations of the illusory changes had been made by either observer at the time of writing. Hence the reader may be allowed a large measure of hesitation in accepting at their full value the interpretations placed upon the observations as they are now reported.

Two illustrations will serve to show the type of illusion examined in the first paper. In one case the illusion motive is provided by bounding verticals placed at the left end of the horizontal. These extend equally above and below the line, and run through a considerable range of length from a mere bounding mark to a line nearly five times the length of the standard. In the second case the illusion motive is furnished by a greater or less continuation to the left of the horizontal itself, the length of the latter being indicated by a short vertical mark through the line. In both of the cases named the free standard horizontal lies at the right, and under the two sets of conditions here stated the free horizontal appears invariably *shorter* than the objectively equal line that suffers an illusory change.

Three points are particularly emphasized in this paper. (1) Whatever influences the ease and rapidity of eye-movements, whatever, that is, offers incentives or checks to such movements, or supplies points of rest, is bound to affect the perceived length of a horizontal. (2) The vacillating character of many illusions, involving frequently an inability to pass definite judgment upon compared magnitudes, springs from purely optical conditions introduced by the very process of examination itself. (3) The influence of 'contrast' must not be applied in as simple a fashion as has often been customary. 'Contrast' may be a frequent coöperating factor, but its effects are often overshadowed by the eye-movement influences. In support of this claim there is an interesting analysis of the well known contrast figure of Müller-Lyer.

Under Kiesow's direction Dr. Botti continued the general examination of horizontals and comes everywhere to the same conclusions. He discusses particularly the influence of the position of a division

mark upon the perceived length of a line. The outcome is that while the placing of this mark at the middle of the line causes an apparent shortening, moving it towards either end produces at once an apparent increase of length. Dr. Botti also finds that a rectangle with a base approximately four times the altitude and formed of horizontal parallels has a maximum apparent height when the horizontals are neither too numerous to attract attention to themselves individually nor too few to produce a marked retardation of the vertically moving eye. Thus a rectangular figure with a base of about 55 mm. and an altitude of about 15 mm. seems highest when formed of six equidistant parallels, and much diminished in height when this number is reduced to four. The only possible interpretation seems to the author to be in terms of the degree of difficulty with which the eyes range over the vertical extent of the figure.

Though all real criticism of these papers should be withheld until their promised continuations have been given us, attention may at least be called to one point. Is it not hazardous and to a large degree profitless to talk glibly of the influence of eye-movements in the absence of any exact knowledge of what these eye-movements actually are in any given case? In this day of registration possibilities the cautious psychologist is not likely to find any satisfaction in the unverified assertion that the eyes are behaving thus and so. And until some graphic evidence can be furnished in support of such assertions, they must be viewed merely as hypotheses displaying cleverness but not carrying conviction.

Theorie der geometrisch-optischen Gestalttäuschungen. LUDWIG BURMESTER. *Ztsch. f. Psychol.*, 1906, XLI., 321-348.

This paper is concerned with certain simple illusions of reversible perspective. The title is misleading inasmuch as the theory sought is not psychological in character but of a strictly optical nature cast in terms of linear perspective. The object chosen for observation was a rectangular piece of cardboard, 100 mm. long by 30 mm. wide, mounted in weather-vane fashion upon a vertical rod which could be rotated by appropriate appliances. The head of the observer was fixed, and the cardboard rectangle and its reversed perspective were viewed against a background of gray. The point of the investigation was to discover the perspective principles which apply to the relations between the normal and reversed figures both when at rest and when moving about the axis of rotation. The results do not permit of convenient summary. And indeed the entire investigation seems to the reviewer to have only

a remote psychological bearing, its appeal being rather to the interests of perspective analysis. It is significant, however, to have a careful demonstration of the fact that the form of an illusory perception and its behavior towards the normal object can be treated from the point of view of mathematical optics.

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A Study of some of the Correlations of the Müller-Lyer Visual Illusions and Allied Phenomena. W. G. SMITH. Brit. J. of Psychol., 1906, II., 16-51.

The purpose of this study was to throw light on the meaning and relations of the Müller-Lyer illusions. The diminishing and the increasing forms of the illusion and a plain line, all of the same length, were estimated and reproduced by the observers in two ways, by visual perception and by kinæsthetic perception.

A correlation was discovered between the normal estimation of the plain line and the two forms of the illusion. The magnifying illusion was found to be greatest with the group of observers which underestimated the plain line, and least in the group in which it was over-estimated. The correlation with respect to the diminishing form of the illusion and the estimation of the plain line appeared to be direct in one group, while no correlation was apparent in the other. Smith accordingly formulates the principle that each form of the illusion tends to reach its maximum effectiveness where the preëxisting tendency in estimating the plain line is in the opposite direction. There is no correlation between the two forms of the illusion. An individual highly susceptible to one form is not necessarily equally susceptible to the other form. Accuracy in the estimation of the plain line is accompanied by lessened subjection to the illusion. Familiarity and practice due to the successive estimations had no marked influence in diminishing the effectiveness of the illusion.

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Ueber die Beziehungen von Zeitschätzung und Bewegungsempfindung. ERICH JAENSCH. Zeitsch. für Psychol., 1906, XLI., 257-279.

There is a somewhat familiar illusion of distance which manifests itself when one attempts to move, *e. g.*, the hand through two equal distances in the same straight line, in the fact that the movement is less when the muscles involved are already contracted. Jaensch

attempts experimentally to determine the factors upon which this depends.

The persons investigated were all, to a greater or less extent, subject to the illusion, the second movement being shorter than the first; and the time record showed an approximately equal duration for each movement.

In an analysis of the factors involved, the author rejects the comparison of intensities of the two motor sensations, because of an assumed qualitative change occurring with the progress of the movement. The visual factor is eliminated by having the eyes of the observer closed; and 'position sensation' on account of the same positions in the joints not recurring in the two movements. The speed factor is eliminated by having the movements made as freely as possible. His conclusion is, that if the judgment of distance in the two cases does not depend upon the above mentioned direct factors, it must depend upon an associative one. This he finds in the implicit estimation of the time duration of the two movements. They are regarded as equal because the duration of each is the same.

A further question as to why the second movement is more slowly executed than the first, leads to the conclusion that there is also a physiological factor involved, viz., the increasing muscular contraction.

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DREAMS.

L'évolution du rêve pendant le réveil. M. FOUCAULT. *Revue philos.*, 1904, LVIII., 458-481.

In this article, Foucault attempts to show that during the process of awaking from slumber the various parts of a dream, originally incoherent and illogical in respect to both time and place, are reassembled and reconstructed into the coherent, logical form in which we afterward recall them. He believes that every dream goes through the process of 'evolution of logical continuity,' and that it is possible to determine this evolution, or at least its general characteristics, from the observation of a large number of cases of dreams with special attention given to the control of the conditions of awaking.

"This law of logical evolution," he says, "will, in favorable cases, enable us to follow up the dream from its organized form to the unorganized form which it must have previous to the time of awaking; to describe the processes by which the change is accomplished; and even going far back into the past to find the original sources of the

dream, the sensations from which it arises, the transformation of the impressions made by these sensations, and the forces which produce and direct the transformations."

This ambitious prediction, or program, is hardly warranted by the evidences set forth in the article.

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CHILDREN'S DRAWINGS.

Ein Beitrag zur Kenntnis der Kinderzeichnungen. DAVID KATZ.
Zeitsch. für Psychol., 1906, XLI., 241-256.

This paper reports an experimental study of children's drawings, chiefly in the interests of the general psychology of perception. The writer holds that previous accounts of children's drawings have been too largely on the merely descriptive level. The children have been asked to draw from memory or imagination, not from perceptual objects.

His subjects, three little girls of five, six, and seven years, of whom all but the youngest had been to school, were told to make drawings (1) of blue paper models of geometrical figures and (2) of properly drawn representations of these models. The models used were triangle, square, parallelogram, ellipse, cross, cube, square with four legs like a table, three-sided pyramid, cylinder, and three-sided prism. The children were given pencil, paper, and ruler, and were directed to reproduce the objects very carefully and to keep the same places so far as possible. The models remained at a fixed distance.

Reproductions are given of the children's drawings of the table, the pyramid, the cube, the cylinder, and the prism, as well as some typical examples of their drawings from the plates of the table, the cube, and the cylinder, with the correct forms accompanying them for comparison.

These drawings reveal the usual childish disregard of perspective. The top of the table is represented as a square with the legs in the same plane running in one case diagonally out from the corners of the square, etc. In the cylinder, both ends show at once; in the cube, all four sides. The drawings of the five-year-old subject show the greatest lack of approximation to the actual appearance of the models. In the attempted reproductions of the correct drawings only those sides of solids are given which were present in the copy. But the youngest child, for instance, drew the three visible surfaces of the cube as three connected squares in the same plane, two above and one below. The

second child drew the top of the table as square, but made some effort to reproduce the vertical position of the legs.

From these drawings Katz confirms the conclusions of Sully and others that the child draws not what he actually sees but what he already knows about the objects before him. To explain the drawings more satisfactorily than has been done, he discusses the growth of the child's knowledge of the object. A developed perception is made up of the idea or meaning of the object and the sensation-complex which stands as the symbol of this meaning. In adult life attention is directed to the significant object, not at all to the mere sensation content. Adult perception means belief in the object.

With the child, however, in his early experiences of, say, a square and a cube, the bare visual and tactual sensation-complexes form the most important element. Originally present as distinct series, they become associated through concomitant changes. Gradually the sensation-complex aroused by the object in a position of maximum stimulation (for instance, a square surface upright in the median plane of the observer) holds attention better than those aroused by the object in other positions, and so becomes the symbol or type of it in any position whatever. This holds equally true for the cube. The child perceives it in terms of his most intense sensational experience, and draws it with four sides as he knows it through tactual exploration. Similarly, though with less uniformity, he draws an object of its actual size rather than the size it appears to have. The facts of color perception show the same thing. We see a color as uniform, in spite of shadows and different kinds of illumination. The color perceptions of children need to be more fully investigated.

Perception chiefly in terms of the immediate sensation-complex, as revealed in a correct drawing, Katz calls adequate perception; perception largely modified by past experience, as revealed by the children's drawings, inadequate perception. The terms seem to the reviewer unfortunate. Since children can give no introspective account of their perceptual experiences, Katz holds that conclusions from their drawings should be supplemented by the reports of those born blind who have regained their sight. His account of perception is practically that of the best modern psychology of the subject. The number of subjects and of drawings in his study is meager, and his conditions apparently were not rigidly controlled. Moreover, the geometrical materials used seem unduly abstract as a basis for a fair test of the normal perceptions of children of the ages given.

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DISCUSSION.

THOUGHT AND THINGS.

Professor Moore's remarks upon my book of the above title in the March BULLETIN lead me to make certain explanations. I shall refer also to criticisms made by others.

The treatment in my book is a compromise between two methods (as suggested by Professor Russell in the *Journ. of Philos.*). I find it impossible to treat each genetic 'mode' in turn exhaustively, by a method that tries to make out longitudinal 'progressions.' For each topic, a certain before-and-after review is necessary, in order to get the movement of consciousness; and this inevitably requires some repetition and restatement of the main characters of the mode in the interest of the particular problem under investigation. So it becomes a question, in order to reach the most effective exposition, of reducing the retracing to the minimum, without at the same time going over to a barren analytic and structural point of view.

To illustrate: in the second volume I find it impossible to discuss the linguistic embodiment of thought genetically without recurring to the general movement of development of thought, which has already been depicted in earlier chapters.¹

As to the use of new terms — on that point, I simply take up any glove the critic may see fit to throw down. It all depends on whether the conceptions worked out are worth naming, and have not been named before (granting of course the relative appropriateness of the terms suggested). In this matter, it hardly behooves me to anticipate the verdict of the public; but the opinion of the *Nation's* reviewer is this: "The vocabulary of well-considered new technical terms that this volume expounds is in itself a precious gift to psychological investigation. For with each of these new terms there goes a valuable new conception." This is by C. S. Peirce, whose opinion is of the highest.

As to the 'static absolute' I don't care for it — and who isn't tired of it? — because it is a purely logical resort, reached as a presupposition of an equally 'static' truth. But as to a 'dynamic relative' — to suggest a contrast term — that sounds just now fresh and very modern; certainly it is less hackneyed than the other. But when we look it in

I cite this instance since the chapter on 'Thought and Language' is to be printed in the PSYCHOLOGICAL REVIEW for May, and may be glanced at by the reader.

the face, what is its complexion? It is a postulate of a *practical dualism*, as *crassly unintelligible* as the other is *logically over-theoretical*. I can't rest content with a 'dynamic' that has nothing outside to move it and no reason inside for moving! If experience proceeds by readjusting to situations, whence comes the situation that 'puts it up' to it to readjust? Why does it grow discontent with its own habit-world? Is a discrete unintelligible dynamic any better than a contentless formal static? To kick where there are no pricks may satisfy a strenuous 'relative,' but beyond endangering our collections of precious antique china, its only result is to strain its own leg-tendons! I'll stake the whole business on Professor Moore's answer to the following two questions:

First, how can experience of the dynamic-relative type secure or utilize knowledge that is socially valid, without at the same time reinstating other things as valid as the social fellows, including the thinker himself?

Second, how can an experience that has no environment save its own habit, and no reality save its present function, get up any 'dynamic' at all?

Or to put these two questions in one: In what sense is the will of the mother spanking the child part of the habit of the child, and why does the child's experience take on this particular phase of 'relative dynamic'? — this occasional and very disconcerting phase of habit?

The 'relative dynamic' is all right in its place; but so is the relative 'static.' To be 'relative,' we must be *dualistic*, *realistic*, and — 'things are what they seem' becomes the motto of a 'radical empirical' pluralism.

My own view, to be argued fully enough in my later volumes, is that the æsthetic is a mode of experience that not only reconciles these dualisms and pluralisms, *content-wise* — *in a cross-section* — but also continues its mediation *progression-wise*, *longitudinally*: so that we can fairly say that in it experience has a way of finding its dynamics intelligible as a truthful and so far static meaning, and also of acting upon its established truths as immediate and so far dynamic satisfactions. In short, our relativisms are contrast-meanings, dualisms, instrumentalities one to another, and the mediation and abolishing of these contrasts, dualisms, means to ends, removes the relativities and gives the only tenable 'absolute.' This is the sort of 'absolute' experience is competent to reach. If you ask why this does not develop again into new relativities, I answer, *in fact* it does; but *in meaning* it does not. For the meaning is the universal of all such cases of media-

tion. If the mediation effected in the æsthetic is one of *typical meaning everywhere in the progression of mental 'dynamic,'* then it is just its value that it discounts in advance any new demands for mediation which new dualisms may make. The æsthetic is absolute then in the only sense that the term can mean anything: it is *universal progression-wise, as well as content or relation-wise.* It mediates the *genetic dynamogenies as well as the static dualisms.*

The following brief explanations are relevant to certain of Professor Moore's difficulties.

As to 'meaning,' I hold that after meaning arises as over against mere present content, then the content also of necessity and by contrast also becomes meaning; since then consciousness may intend or mean either, or the difference between the two. As I put it in the book, with the rise of meaning there arise *meanings* (in the plural). To hold a content to just its bare presence is to make it a meaning — after consciousness is once able to *mean 'that only and not anything else.'*

As to the distinction between 'general' and 'schematic,' between 'belief' and 'assumption' — that is the radical position of my entire work, and I am glad to have it called attention to. It connects with and carries further the 'assumption' theory of Meinong and the Austrian school. My second volume rests its interpretations directly upon this distinction. To say that 'schematic' meaning, 'assumption,' is not 'general,' nor 'universal,' nor 'particular,' nor 'singular' — all of which I do say — is to say that it is a mode of meaning *sui generis.* It is the *intent of question, assumption, hypothesis, prospective reading* — over against all the other meanings just mentioned, which are those of *belief, acceptance, retrospective reading, proof.* It means that the instrumental intent of a meaning is *not a general meaning, but goes before it.* A meaning can be instrumental *only to a general not yet reached.* And a 'general' meaning, when made instrumental to further discovery, is then not general, but becomes in turn again 'schematic.'

So far from being antagonistic to an instrumental view, this furnishes the clue to it. On this distinction, *and this alone* — one destined I think to prove the most fruitful in the epistemology of modern times — the logical processes can be construed as essentially experimental from start to finish. This is the attempt of my second volume, which is now in press.

In respect to 'effort' and the 'subject,' I do not resort to any hypothesis of 'activity' in a philosophical sense. I find that, for the 'knower' himself, the sense of effort — whatever its mechanism¹.

¹ The kinæsthetic theory is most likely, to me.

distributed variously as 'efforts' here and there, gets *segregated in a sense of control* which is the 'self' of judgment.

As to the 'inwardness' of thoughts — I hold that as thoughts they are in a context of reflection, recognized and intended as such; but that there is always that belief-reference which acknowledges or assumes the original control-sphere. I reflect alike on 'serpents' and 'sea-serpents,' but any intelligible use of them as meanings presupposes the reference to their respective existence spheres. This reference is for me the essence of 'truth' as meaning. The serpent idea is 'true' when referred to the proper sphere, and so is the sea-serpent idea. There is always the *matching of experiences* as between *what is true* and what the true *is true to*.

One other point. While saying that the entire world of objects of experience or reflection is such to a self or subject, and is also referred to its original control, which 'holds the entire system to its moorings,' I mean two things besides. First, the original control, the 'moorings,' to which each idea or object of reflection is referred, is itself *the experienced* or made-up set of meanings of that original mode — as the reference of the idea 'horse' to the perceptual horse-experience — the envelope of the developing psychic process *being nowhere ruptured*.¹ The controls, 'foreign' as well as 'inner,' are all psychic meanings. And second, the dualism of controls does, as Mr. Moore suggests, live to the last within the sphere of logical meanings; it will not down; the dualism of reflection itself is a redistribution, *not a mediation*, of the control factors. But my conclusion from this is not a dualistic one, and not one of intellectualism; but one of a-logicism. For the failure of the logical to mediate its own and the earlier dualisms is just the opportunity of a genuine mediating experience. The necessity of logic is the opportunity of æsthetic. It is the cry of embarrassment of logical finality, on the one hand, and of pragmatic relativity, with its cruder dualisms, on the other hand, that has rung down the passages of history, and inspired the various solutions of immediacy, all the way from the logical postulates of pure identity, to the affectivist postulates of mystical contemplation. However ineffective these historical 'immediacies' may have proved, they have recurred and will still recur. My own effort is to find out just what is universal and saving in this recurrent endeavor, seeing that genetic analysis shows the endeavor to be inevitable.

J. MARK BALDWIN.

¹ It is however an envelope of inter-psychic or common, in no sense private meaning, as I argue in detail in the forthcoming Vol. II.

BOOKS RECEIVED FROM MARCH 5 TO APRIL 5, 1907.

Philosophische Terminologie in psychologisch-sociologischer Ansicht. F. TÖNNIES. Leipzig, Thomas, 1906. Pp. xvi + 106. M. 3.50. [Reprint of the Welby prize essay, from *Mind*, 1898, with additions.]

L'art et l'hypnose. Interprétation plastique d'œuvres littéraires et musicales. E. MAGNIN. Pref. by TH. FLOURNOY. 2d ed. Paris, Alcan, no date. [Fine illustrations by F. Boissonnas of the plastic attitudes under hypnotic suggestion of Mme. Magdeliene G.]

La morale sexuelle. A. WYLM. Paris, Alcan, 1907. Pp. iv + 327. Fr. 5.

Essai critique et théorique sur l'association en psychologie. PAUL SOLLIER. (Bibl. de philos. contemp.) Paris, Alcan, 1907. Pp. vii + 188.

The Psychic Riddle. I. K. FUNK. New York and London, Funk & Wagnalls, 1907. Pp. viii + 243.

Das Pferd des Herrn vom Osten (der kluge Hans). O. PFUNGST. Intr. by C. STUMPF. Leipzig, Barth, 1907. Pp. 193. M. 4.50.

Raum und Zeit. F. RATZEL. Ed. by P. BARTH. Leipzig, Barth, 1907. Pp. viii + 177. M. 3.60.

Der Sehraum auf Grund der Erfahrung. R. VON STERNECK. Leipzig, Barth, 1907. Pp. vii + 96. M. 3.50.

The Evolution of Matter, Life, and Mind. W. S. DUNCAN. Philadelphia, Index Co., 1907. Pp. 250.

Bericht über den II. Kongress für experimentelle Psychologie (Würzburg, April, 1906). Ed. by F. SCHUMANN. Leipzig, Barth, 1907. Pp. xviii + 266. M. 9.

The Persistent Problems of Philosophy. M. W. CALKINS. New York and London, 1907. Pp. xxii + 575. \$2.50 net.

Familienforschung und Vererbungslehre. R. SOMMER. Leipzig, Barth, 1907. Pp. vii + 232. M. 9.

Psychology Applied to Medicine. D. W. WELLS. Philadelphia, Davis Co., 1907. Pp. xiv + 141.

Aspects of Kinetic Evolution. O. F. COOK. (Proc. of the Washington Academy of Science, Vol. VIII.) Washington, 1907.

The Political Thought of Plato and Aristotle. E. BARKER. New York, Putnam; London, Methuen, 1907. Pp. xxii + 578.

The Integrative Action of the Nervous System. C. S. SHERRINGTON. London, Constable; New York, Scribner, 1907.

Stereoscopic Vision and its Relation to Intensity and Quality of Light Sensation. T. R. ROBINSON. (Univ. of Toronto Studies.) Toronto, The University, 1907. Pp. 78.

NOTES AND NEWS.

THE annual meeting of experimental psychologists will be held at the University of Pennsylvania on April 17 and 18.

DR. CHARLES H. JUDD has been promoted to be professor of psychology and director of the psychological laboratory at Yale University, and Dr. William E. Hocking has been made assistant professor of philosophy at the same institution; Dr. Hocking will assume his duties in the fall of 1908.

THE following are taken from the press:

AT Columbia University Dr. W. P. Montague has been made adjunct professor of philosophy, Dr. Harold Chapman Brown has been advanced to the position of tutor in philosophy, and Mr. Walter B. Pitkin has resigned to accept an editorial position.

MR. NOBLE HARTER, who conducted a research on the telegraphic language in conjunction with President W. L. Bryan, of Indiana University, died in Pasadena, Cal., on February 23.

IN view of the death of Professor Garman, Professor F. J. E. Woodbridge, of Columbia University, will lecture before the department of philosophy at Amherst College during the present term.

AT Brown University lectures have been given by Professor Josiah Royce, of Harvard University, on 'Provincialism,' and by Professor E. C. Sanford, of Clark University, on 'The Rôle of the Different Senses in Mental Life.'

THE Alice Freeman Palmer fellowship at Wellesley College has been awarded to Miss Helen B. Cook, who will study psychology in Germany.

THROUGH a recent donation by Mr. Francis Galton, London University has been enabled to extend the scheme for the study of national eugenics founded under his previous benefaction. The work will be carried on under the supervision of Professor Karl Pearson, in consultation with Mr. Galton, with a corps of active assistants.

THE PSYCHOLOGICAL BULLETIN

MODIFIED CAUSATION FOR PSYCHOLOGY.

BY PROFESSOR GEORGE M. STRATTON,

Johns Hopkins University.

In a paper of originality not long ago¹ Dr. Woodbridge spoke of the pleasure which many derive from the question of interaction and parallelism. He told us, with no attempt at consolation, that the view of consciousness which he presents sweeps away the problem of mind and body and all the pleasant dissipation which this involves. After such a gay disposal of the case, it would seem almost wanting in respect to continue to discuss the old matters as though nothing whatever had occurred. My own reasons for believing in the continued existence of this problem have, however, already been set forth,² and I wish now to speak of a way of modifying our thought of causality, which will perhaps help us to avoid some of the difficulties which beset this field.

The chief motive which induces so many psychologists to vote against interaction, which has mountain-high evidence in its favor, and to support parallelism, although this is so alien to the spirit of modern science—the chief motive, it seems to me, is that we are almost possessed by a fixed idea as to the requirements of the causal relation.

We are inclined to say, in the first place, that a mental event and a physical event can never be regarded as cause and effect, respectively, since the two occurrences cannot be conceived as parts of one continuous process. We cannot observe (it is said) nor can we well imagine the suitable connecting links between facts so diverse. Nor can the farther requirement be met that cause and effect should display a certain quantitative equivalence. Physical and mental proc-

¹ 'The Nature of Consciousness,' *Journ. of Philos.*, II., 119.

² 'The Difference between the Mental and the Physical,' *PSYCHOL. BULLETIN*, III., 1; 'The Character of Consciousness,' *PSYCHOL. BULLETIN*, III., 117.

esses are so unlike, that no common unit of measurement in the two realms is possible.

When passing judgment in a matter of this character we must bear in mind that the idea of causation as we find it in use in natural science is a curious mixture of elements from different sources — from 'experience,' and from sources other than experience. In the language of philosophy, many of us would willingly say that our notion of causality is *a priori* — that it is not derived from experience; but, on the contrary, the organization of our sense-impressions into an orderly experience would be impossible were it not for the activity of this causal energy within us.

And yet this is by no means the whole truth. For in its modern development the causal idea requires the facts to conform to certain tests before they may be regarded as joined in the causal bond. And these tests themselves are not arrived at *a priori* and independently of all sense-experience. Thus we cannot say that the features which many now regard as essential to the causal relation — namely, the equivalence between what the cause loses and what the effect gains, and the possibility of a continuous transition from one of these terms to the other — we cannot say that all of this lies as deep in us and has the same original certainty as does the thought that every occurrence has some cause. We have an ungovernable instinct to search for causes; but for recognizing a cause when we see it, nature leaves us to our own devices. We must learn the special marks of causes and effects; only by observation can we determine what tests the facts are capable of meeting. The growth of science has brought new formulations of what is implied in the causal relation. But men believed practically that things have causes, and selected with perfect assurance those events which would explain other events, long before they became convinced that a continuous transition or a quantitative equivalence is in any way involved in the causal link.

There is thus an empirical element in these tests, which does not appear in what we may call the original idea of cause. If men had not observed that outward facts did in many cases actually reveal transitions and equivalences, it would never have occurred to them to demand that such transitions and equivalences should be present in every case. The scientist would still have believed in the cause-and-effect relation, just as the farmer and the merchant today believe, without being mathematically scrupulous in selecting the special events between which the causal relation should be thought to exist. Two events, — let us say a great demand for some commodity and a high

price for it, — regularly occur together, the one increasing as the other increases,' and diminishing and disappearing as the other diminishes and disappears. A bare concomitant variation of this kind, where it is impossible to observe any exact mathematical ratio between the changes in the two events, would have amply satisfied our requirements for a causal connection, if the outer world had steadfastly refused to give us more. But we so often find cases of concomitant variation where the changes in the two events *can* be reduced to some common unit of measurement and expressed in an equation, or where we can pass without break from one to the other occurrence, that we have become spoiled and ask for this in all cases. But these special requirements are not an inevitable logical development of the idea of cause, — a development like that of the idea of 'triangle' into the *pons asinorum* and all the other theorems and corollaries regarding three-sidedness. The various features in the idea of causation which physics has adopted cannot all be demonstrated by abstract logic and without appeal to the contents of actual experience. They are not prime necessities of our thinking. The rather they are, in a large measure, habits of thought which the course of empirical events has started and encouraged. The division between what is original and what is an after-accretion is hard to make, but it is similar to what we have in the case of all our other primitive instincts. Marriage, for instance, has in and behind it a fundamental and *a priori* element: the young man's fancy lightly and inevitably turns to thoughts of love. This much Nature dictates. But Nature does not, in the very instinct, determine the kind of wife he shall select. There is no fatal decree that the approved one shall be just eighteen or play the violin or bring exactly so much in dowry. So far as the mating instinct is concerned, the young man here is free.

When once we notice that in the scientific search for the causes of events in our experience our action has a like composite *Motivirung*, — that our guiding idea is a mingling of an original element and of elements due to circumstances and special outward encouragements — the bearing of this on the problem of causation in psychology is clear. The form which the principle of causation has assumed in our modern sciences is largely the result of observations in the field of physical research. It is not some sacred and inviolable idea whose slightest change would profane and destroy its very essence. It was originally given us in the rough, and we have shaped it to our needs. But the particular form which answers the needs of physical research is not necessarily the one best suited to its use in that larger world which in-

includes things mental as well as physical. In the long run we can hardly afford to have the form of an idea which is used so universally determined solely by the needs and successes of physical science. We must give it that shape and fashion which will bring the greatest intellectual happiness to the greatest number. If the idea of cause as defined for physical research could be effectively applied in psychology and in the intermediate realm of psycho-physiology, it would indeed be well; but there is little hope that this will ever be. The physical conception of cause will not work in psychology, it will not work in the borderland of brain and mind. The question as to the nature of causation, therefore, is for science in the large a vital one. Upon its issue hangs the success or failure of our attempted conquest of the larger world. We have before us this alternative: either we must modify our idea of causation, or we must cease to speak of causation as a universal principle in our experience. It seems to me that if this really is the case the outcome is not difficult to foresee. We shall not give up the universality of the principle, but we shall surrender some of the special tests which physical events in their intercourse with one another can meet, but which events generally cannot. But this does not mean that all tests shall be abandoned. We have merely to limit our demands. For instance, we might still require concomitant appearance, variation, and disappearance, but not perfect continuity nor quantitative equivalence; and the various 'canons of induction' might still be employed to determine whether a causal relation exists or not. Causation thus restored to more simple lines could not only be used in psycho-physiology and we should no longer feel forced to the artificial parallelist assumption, but such a conception of causality might be used for the interconnection of psychic events directly with one another, and not just indirectly by first connecting them with neural processes.

To all who are interested in the stability of thought and of the scientific method such a proposal will seem less revolutionary when a precedent for the change is pointed out. On the philosophic side of science a precedent is right at hand. We are accustomed to shift our meaning of the word 'cause' as we pass from one field of work to another. Thus he who seeks for causes in a transcendental realm makes not the same demands of his cause as the natural scientist makes of his. The philosopher proves the sufficiency of his proposed cause by other tests than are used in the world of sense. For metaphysics, the cause and its effect need not be simultaneous, they need not vary the one with the other, they need not be the same in quantity. Between this metaphysical extreme and the physical extreme may there

not be some intermediate and yet valid idea of cause? Psycho-physiology and psychology form a kind of bridge between the sciences of things visible and the sciences of the invisible world; for the objects of psychology are not before the bodily eye, as are the objects of the physical world, neither are they grasped mainly by reason and desire, as are the things of the ideal world. The occurrences of the mind are experienced directly, like physical events, and yet for the most part they are invisible like the things of the spirit. They partake of both natures, and may well require for their study modified instruments and modified ideas.

PSYCHOLOGICAL LITERATURE.

EMOTION AND FEELING.

Essai sur les passions. TH. RIBOT. Paris, Alcan, 1907. Pp. vii + 192.

The term *πάθη* among the Greeks denoted a wide range of affective phenomena, including appetite and desire. Aristotle describes them, in general, as states powerfully influencing judgment accompanied by pleasure and pain. There was some dispute as to their subject, whether it was the body or the soul, and whether, if the latter, reason was affected or only the irrational faculties. The prevailing view was that they were affections of the soul, but only in its inferior parts organically united with the body; Chrysippus, however, regarded them as diseases of the reason itself. Besides the noteworthy attempt on the part of the Stoics to classify them in terms of movement (contraction-expansion, inclination towards — recoil from), there was also some recognition of the difference between *πάθος* as a transient disturbance and as a more or less permanent and ingrained character (*e. g.*, in Aristotle's distinction between *πάθη* and *ἕξεις*, and in the Stoic distinctions of emotional dispositions, chronic ailments and infirmities), but this recognition was imperfect and ill-grounded and led to no fixed terminology.

The *πάθη* of the Greeks became the *passiones*, *affectus* and *affectiones* of later writers, the term generally preferred being perhaps *affectus*. In modern times, down to the last century, French and English writers quite generally treated the same phenomena under the term 'passions.' Now, however, this term, in this sense, has almost entirely disappeared from our psychological text-books, its place having been taken, under the influence apparently, as Ribot suggests, of Darwin and Bain, by 'emotion,' the indiscriminate use of which perpetuates not a little of the confusion which, in this department of psychology, is our inheritance from the Greeks.

In a paper on the specific marks of passion read at the International Congress of Psychologists at Rome in 1905, Ribot sought to clear up this confusion by restoring to psychology the term 'passion,' but in a restricted sense, and at the same time limiting the meaning of 'emotion.' The meanings proposed were in general accord with Kant's well-known distinction between *Affekt* and *Leidenschaft*. Instead, however, of stopping with Kant's metaphors, Ribot undertook a thorough analysis.

Provisionally grouping the phenomena of the affective life into affective states, emotions and passions, and including under the first head appetites, tendencies and desires, he distinguished emotions as violent but transient disturbances of the psychic equilibrium, from passions as states originating in phenomena of the first group and characterized, not merely by relative permanence and strength, but especially by the predominance of fixed and controlling ideas. In this description passion appears as not only differing from emotion, but even as its contrary. Emotion appears as a primary state, the direct result of the natural constitution, passion as a secondary formation, partly natural, in that its basis is found in instinctive tendencies, in certain cases in 'temperament,' partly artificial, in that it is a product of thought and reflection. The paper was devoted to the elaboration of this description. Emphasis was put on the instinctive tendencies as the basis of the passion and on the fixed or dominant idea in its organization. Every passion—such was the thesis—is an attractive or repulsive tendency becoming concrete and self-conscious in an idea. It is acknowledged, of course, that just as a chronic disease is liable to acute attacks, so a long continued passion is traversed by emotional accesses.

The present work contains a further elaboration of the subject under three heads,—the nature of passion, the 'genealogy' of the passions and how passions end. The first and third parts have already appeared separately in the *Revue philosophique*. The gist of the first part is contained in the following: "Viewed synthetically, passion is a solid bundle of coöperant forces: at the center a tendency vigorously impelled towards an end; dragging into its vortex perceptions, images and ideas; adding to the real the work of the imagination; sustained, finally, by a logic both rational and extra-rational" (p. 42). The third part shows passion terminating in five different ways,—by being sated, by transformation into another, by the substitution of another, by insanity and by death, the general conclusion being that "the probability of a passion becoming extinct is directly proportional to the amount of emotional and inversely proportional to the amount of intellectual elements systematized in it" (p. 143). This again vindicates the conception of passion as an intellectualized form of tendency. The general position is still further elucidated by the two middle chapters of the book, now published for the first time, treating of the 'genealogy' of the passions. Ribot laments at the beginning of this part of the discussion the almost complete absence of any positive knowledge of the physiology of the passions in detail. His own treatment is based on a practical classification of tendencies into those of self-preservation,

of race-preservation, of self-expansion — the affirmation of the will-of-power — and a fourth group representing more individual and varying needs. He then seeks to show under what conditions what passions arise from these several tendencies. Thus from the first two develop the passions of gluttony, drink and sex; from the third, according as it works by sympathy or aims at conquest or destruction, such passions as the extreme form of maternal affection, the many passions of adventure, the passion of avarice, hate seeking vengeance, jealousy; while from the fourth we get the various, usually complex and often highly artificial æsthetic, scientific, religious, political and moral passions.

The discussion of the passions in this last group is particularly full and in the main original. As an illustration of the method we may take what is said of the passion of art. The basis of this passion, it is said, is the æsthetic sentiment, now generally regarded as having its source in surplus energy. The need of this particular form of 'play' activity has various degrees of intensity. In most men it is a subordinate incident of life. In the great creative artists it becomes, we may say, a sort of passion, since their activity is undoubtedly controlled by a dominant and tenacious idea. Yet theirs is not the passion in its extreme form, not what we especially mean by the passion of art. This extreme form, blind, absolute and intolerant, belongs, as a rule, not to the creative artists, many of whom have lived a rich and varied life, many-sided in interest, but to the dilettante, and is hardly to be met with before the nineteenth century. Ribot finds the explanation of this passion in the decay of religious faith and the substitution of art as the consoling ideal, in the tendency of these 'æsthetes' to withdraw from the world of action and to live in a world of the imagination, finally, in the influence, according to the character, of pride and vanity.

This is the third work which Ribot has published in recent years on the psychology of the affective life. The *Psychology of Feeling*, the *Logic of Feeling* and this essay constitute the most notable exposition of a connected doctrine of the 'affections' made by any author in our time. Together they afford a conspectus of the present state of psychology in this field and contain besides solid contributions to its advance. Nor has Ribot probably ever done anything better than the present short, but masterly essay. The more his central positions are reflected on, the more likely are they to be accepted. Objections to his view of passion on the score that, *e. g.*, dogs and children exhibit jealousy, and yet can hardly be said to have this feeling intellectualized, are trivial; it is only necessary to consider that the same names

may be applied to very different phenomena. Ribot has pushed his analysis further. He has shown that there are indeed many important forms of the affective life characterized and formed as he describes. We cannot do better than, in respect to passion, at least, to adopt his terminology. There is nothing, it should be added, in his treatment that is doctrinaire; he is as fully aware as any one of the subtle transitions between the various forms of affection and of the great differences in their duration and degree.

SMITH COLLEGE.

H. N. GARDINER.

Ueber Gefühlsempfindungen. C. STUMPF. *Zeitsch. f. Psychol.*, 1906, XLIV., 1-49.

This article, the substance of which was given last year as an address before the second Congress of the Society for Experimental Psychology, is an able plea for regarding what are sometimes termed sense-feelings, including what are commonly termed feeling-tones, as sensations. The enquiry embraces bodily pains and pleasures as well as the pleasantness and unpleasantness connected with the special senses. The question, in short, is the old question of pleasure-pain as it used to be discussed before it came to be so generally recognized as now that bodily pain, at least, *Schmerz* (and presumably also bodily pleasure, *Wollust* and its congeners) is a specific sensation-quality and that the real matter now in dispute is as to the nature and psychological relations of the pleasantness and unpleasantness of various kinds of 'contents.' It will seem to many, therefore, an antiquated enquiry whether everything here included is to be regarded as (a) an attribute of sensation ('affective tone'), or (b) a unique kind of psychic element ('feeling' or 'affection' *vs.* sensation), or (c) sensation. The enquiry, it may be urged, should have excluded bodily pain and (some would urge) bodily pleasure, and should have limited itself to the affective algedonic qualities. The objection, however, is overruled if we accept Stumpf's doctrine of the disagreeableness of pain. It is commonly assumed by those who regard bodily pain as a sensation, that it is a sensation having, usually, an extremely disagreeable affective character, and that thus there is a distinction between the disagreeableness of the pain and the sensation-quality of the pain as pain. This distinction Stumpf denies; he holds that painfulness is the essential quality of the sensation of pain in the same way that warmth is the essential quality of its sensation, and explains the so-called pleasure of pain as due to other added conditions. If this is conceded, then evidently there is one sensation at least,—and the same argument would naturally apply to bodily pleasure—which is at the

same time an affective quality. It is possible, therefore, to entertain the suspicion that affective qualities generally may be essentially sensations. The case of pain would not justify the conclusion that pleasantness and unpleasantness are everywhere but differently modified intensities of bodily pleasures and pains. The question of kinds is left open. But it justifies the inclusion of bodily pains and pleasures in the question of a general theory.

Stumpf reproduces Külpe's most convincing arguments against the 'attribute' theory of pleasure-pain. The choice, therefore, lies between regarding these feelings as unique mental elements and regarding them as sensations, and the latter view has in its favor the principle of economy unless there are conclusive reasons to the contrary. Stumpf has no difficulty in showing that the positive marks usually held to distinguish the sense-feelings from sensations, *e. g.*, subjectivity, absence of localization, etc., are insufficient. The negative argument on which Külpe chiefly relies, namely, that pleasure-pain cannot be ideally revived, is held not to hold for bodily pleasures and pains, while the fact that the ideal revival of smells, colors, tones, etc., is commonly connected with real feelings of pleasantness or unpleasantness is not regarded as conclusive against the sensation theory. For it may be plausibly suggested that here the original feeling-sensations are centrally excited and that any revival of the process tends, therefore, to be hallucinatory.

The greatest difficulty is in applying the theory to the so-called feeling-tones of sensation where the stimulus is moderate or weak. Where the stimulus is very strong, probably pain-sensations are aroused. The theory in the case of a moderate or weak stimulus is that of a central *Mitempfindung*. Here the most serious objection is that the pleasantness or unpleasantness cannot, by any effort of attention, be isolated. But it is to be observed, says Stumpf, that in the case of isolated sensations of medium intensity, the pleasantness or unpleasantness is usually not pronounced. When several tones or colors are combined, the sensible affects are greater, and they are still greater in the case of tastes and smells. But here the non-isolability is not so certain. W. Nagel, for example, asserts that while it is impossible for him to reproduce smells, he can easily reproduce the feeling of their pleasantness or unpleasantness. A closer examination of this case, however, leads Stumpf to the conclusion that it is one of mood rather than of a simple sensory affection. But he believes himself to experience pleasant or unpleasant sensations and not merely, as he formerly thought, to perform acts of approval or disapproval, in read-

ing music while hearing other music, and he rejects the theory that, in this case, the mere notes are the bearers or sensational basis of the feelings rather than their psychical excitants. He admits, however, that the question of fact is at present extremely difficult to determine.

In presenting the hypothesis that the so-called sense-feelings and feeling-tones of sensations are not subjective states, but objects and materials of consciousness in the sense in which the acknowledged sensations are objects and materials of consciousness, Stumpf has no intention of obliterating the general distinction between the other sensations as intellectual and these as emotional; but this distinction, he holds, is not a descriptive difference affecting the qualities themselves, but a difference regarding their effects and psychical connections. And the distinction is not absolute, for muscle and temperature sensations also play a large part in emotion. The real importance of the suggested classification is in its application to psychological investigation. Among other questions Stumpf mentions that of 'untuned' sensations. On the 'attribute' theory, the feeling must be assumed by a sort of *a priori* necessity; but if the feeling is a *Mitempfindung*, we are under no such compulsion. There is a similar absence of compulsion in regard to the dependence of the feeling-tone on the sense-quality. There is a general constancy, but not such as to allow us to regard the feeling as simply a function of the sensation. The sensational view is especially hopeful, Stumpf thinks, for the still unripe problems of the individual and general evolution of the sense-feelings and the connected striking differences with like stimuli. The teleological theory, helped out by the principle of accommodation, is supported by some facts. But apart from the indefiniteness of the utility formula, how are we to apply it to the feelings connected with the higher senses? How can we say that the smell of the rose is useful, while that of garlic is harmful? Helmholtz's theory may account for the disagreeableness of dissonance, but what explains the agreeableness of harmony? Stumpf gives no answers to these questions, but he interestingly suggests a genetic theory for certain feelings on his hypothesis by reference to principles that obtain in the association of sensations, *e. g.*, directions of attention, dispositions of judgment, habits of various kinds.

The article is a noteworthy contribution to a tendency represented by a number of recent writers, Meynert, Lagerborg, M. F. Washburn, etc., a tendency with which the present writer is in sympathy — to break down the hard and fast distinction between sensation and feeling, — and deserves the careful consideration of all who are interested in the psychology of feeling and the related theory of value.

H. N. GARDINER.

SMITH COLLEGE.

A Study of Affective Qualities. S. P. HAYES. Amer. Jr. of Psychol., 1906, XVII., 358-393.

In 1902 Titchener published (Wundt Festschrift) the account of an investigation in which the tridimensional theory of feeling was put to an experimental test. The evidence was in favor of the dual theory, but the experiments were admittedly too few in number and dealt with only two of the Wundtian dimensions. In the present paper the work is continued and made to cover the three dimensions. Clangs and metronome beats are again the stimuli used, since Wundt himself admits that clangs are exciting and depressing, and that time intervals are straining and relaxing, whatever else they may be.

The technical details were carefully attended to. In the harmonic experiments a noiseless seconds pendulum was used. The 24 tones in three separate octaves were combined in all possible pairs, making a series of 276 pairs of tones. The series was formed by chance, and rearranged so that the same tone should never occur in two successive pairs. This series was given 12 times to each observer, 6 times with lower tone first and 6 with upper first. In each series the observers reported on one affective quality only.

In the metronome experiments two metronomes were placed in sound-proof boxes. A rubber tube with stopcock from each box joined at a Y, whence the sound from either passed through a single tube into the dark room, where it was distributed by a megaphone funnel. Fourteen rates were used combined in pairs, making a series of 91 tests. In each pair the slower rate was given first.

The conclusions from both experiments are as follows :

1. Judgments of pleasant and unpleasant were always easily made and natural. The curves of pleasant and unpleasant follow opposite courses.

2. No evidence was obtained of the existence of a plurality of pleasant or unpleasant qualities. Pleasant and unpleasant appeared to be homogeneous and simple.

3. Judgments of strain were easy and direct. Strain was described in muscular terms. Increasing strain meant uniformly increasing unpleasantness. There is therefore no evidence here of a new affective quality.

4. Excitement-judgments upon clang were varied. There is no specific evidence of an excitement dimension or of a number of different excitement qualities. The excitement judgments on the metronome tend to be purely intellectual. Fast rates are exciting, slow ones depressing; high degrees of excitement are found unpleasant.

5. Depression judgments are still less direct and observers report different experiences. For two observers depression meant tranquility, soothing calm, and the curves are pleasure curves.

6. Relaxation judgments vary. There is no evidence of a specific relaxation quality or dimension.

This evidence supports the dual over against the tridimensional theory. The author, however, does not give his results as conclusive. He claims only that whereas the tridimensional theory is dogmatic, his results are based upon experiments and observations 'made under standard conditions, with trustworthy observers, and by an approved method, which allows of the correlation of objective and subjective results.'

CAROLA WOERISHOFFER.

BRYN MAWR COLLEGE.

Jealousy. ARNOLD L. GESELL. Amer. J. of Psychol., 1906, XVII., 437-496.

This is another of the series of papers which have been issuing from Clark University for a number of years. A questionnaire was sent out to various schools and individuals and returns have been received upon the basis of which to a considerable extent the work of the paper rests. A summary of the results is brought together at the close. Here we are told that jealousy is a fundamental instinct that bears strong resemblance to anger, fear and grief and shows relationship to the proprietary instinct. It is a safeguard against the social instinct, and mutual aid forms a strong off-set to jealousy. It appears in the lowest forms of animals and is equally fundamental in human beings, manifesting itself in the child of a few weeks. As the child grows the tendency to rivalry increases, and this instinct shows more complexity and refinement. The more expressive movements are less pronounced, and at adolescence depressive symptoms often appear. People of all temperaments are subject to it, but its manifestations are varied. It is "the most painful of all emotions, . . . due to the intense subjectivity of the psychosis, to the obstruction of impulses of pride and appropriation, to the disorganization of profoundly egocentric and highly systematized ideas." Some authors say it is the most universal form of hatred and therefore a study of its various forms is of the greatest value to society. Jealousy may become a factor in education as a stimulus to instruction, but it should be excited only in pressing necessity. History shows it to have been an important factor, too, in shaping social progress. The scope of jealousy is much wider than is ordinarily recognized and is the basis of many attitudes which individuals assume towards other individuals or toward society. It

modifies social customs and institutes a spirit by which whole groups or nations may be moved.

DONNA L. WITHEY.

UNIVERSITY OF NEBRASKA.

The Effect of Music on Thoracic Breathing. EUGENIA FOSTER and E. A. McC. GAMBLE. *Amer. J. of Psy.*, XVII., 406-414.

A series of experiments was performed at Wellesley College in the years 1903-4 and 1904-5 with the purpose of finding the relation between the emotional effects of different kinds of music and changes in respiration. The Sumner pneumograph was used, and results recorded on a kymograph. The subjects were college students.

The problem was two-fold: (1) the effect of music in major and minor keys; (2) the effect of loud and soft music. The music was furnished by the chapel organ, and the selections included hymn-tunes; some of Mendelssohn's chorals; compositions chosen for variety of major and minor passages; and certain ones chosen for variety of æsthetic effect.

The authors look upon the series of experiments as a mere beginning, for their results are vague. They only show that (1) listening to any sort of music tends to shorten the expiratory pause and to make the breathing faster and shallower — effects characteristic also of non-emotional mental application. (2) Music-stimuli do not seem to affect the regularity of the breathing. (3) There is no noticeable difference in the effect of major or minor, of loud or soft music.

In explanation of the fact that the records show the rapidity and shallowness, but not the regularity characteristic of attention, the authors suggest that music attracts the attention without steadily holding it or preventing associated trains of thought.

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ÆSTHETICS OF FORMS.

Ueber die Wohlgefälligkeit einfacher räumlicher Formen. Eine psychologisch-ästhetische Untersuchung. JACOB SEGAL. *Arch. f. d. ges. Psychol.*, 1906, VII., 53-124.

The experiments on the æsthetics of simple visual forms on which this study is based were carried on at the University of Zurich during three semesters of 1904-1905 under the direction and with the participation of Professor Ernst Meumann. Only about a fifth of the article is devoted to the experimental procedure. The first part gives a critical account of the analogous investigations of Fechner and Witmer;

the last part analyzes the general æsthetic experience in the light of Segal's experimental results.

While Fechner's pioneer services in the field of psychological and experimental æsthetics can hardly be overestimated, it was inevitable that his work should be shot through with the metaphysical and logical views of his time. Such pre-psychological influences are seen in his retention of the logical principle of unity in variety, his belief in æsthetics as a normative discipline comparable to logic and ethics, and his assumption that pleasure in simple forms is psychologically simple and therefore unanalyzable.

Fechner's main purpose in his experiments was to discover a figure that was æsthetically pleasing without the aid of any associative factors. The subjects could not, however, exclude the subtler simultaneous associations, the general apperceptive determination of their judgments. Furthermore, his direction to choose the most elegant and harmonious figure insensibly influenced them to select the Golden Section rectangle. Had they been told to choose, say, the most stimulating figure, the results would have been quite otherwise. A more serious flaw is that without analysis of the æsthetic consciousness of his subjects his results were purely statistical, not psychological. His final æsthetic criterion is either metaphysical or a mere counting of votes.

Witmer's investigation was undertaken to test Fechner's results, and confirmed them. He accepted Fechner's theory of direct factors, but employed a much more accurate and refined technique, and took every precaution to rule out associations. With methods far less crude, his results are even more unsatisfactory than are Fechner's. He is still more statistical and quantitative. He makes large use of averages, thus covering up individual differences; and he recognizes no kind of associations except the clear successive associations of the English associationist school.

Segal's aim in his own investigation is purely psychological, to discover in the case of the observation of simple visual forms what goes on in consciousness when something pleases. From this point of view what displeases is of almost equal importance. He uses the serial method, as did Witmer, for ease of comparison. His experimental material was composed of series of lines, rectangles, zigzags, and triangles on white cards of equal size, laid on a black cardboard background. Each series was repeatedly placed before the same observer, for one of the main objects of the investigation was to discover whether the æsthetic reaction to one figure remained constant, and, if not, to inquire into the cause of the fluctuation. In most cases the intervals

between observations did not exceed three or four days; in two cases, however, there was an interval of eight months. Eight persons served as subjects, who had all had considerable psychological training. In the conduct of the experiments the existence of direct factors was treated as a problem, not as an assumption. The subjects were not instructed to select any special type of figure, but were asked to indicate the figures that were to them most pleasing, fairly pleasing, unpleasing, and indifferent. In the results the most pleasing and the fairly pleasing were grouped together. The subjects were also asked to abstract as fully as possible from thought of the utility of the object and from associations in the English-school sense. After each choice the subject was requested to give a full introspective account of the experience. The genuineness of the æsthetic preferences was shown by the fact that although at first the figures seemed in many cases of nearly equal value, later they aroused lively and opposed æsthetic feelings. Memory played a negligible part in successive judgments. In general the pleasing figures held attention better than the unpleasing.

The results show great variability in the judgments of the same figure; thus the figures receiving the largest number of positive votes, *i. e.*, judged pleasantest, also received the largest number of negative votes, *i. e.*, were judged unpleasantest. These 'reversals of judgment' with respect to a given figure occurred for all the subjects.

Even without the introspective reports the tables show that an æsthetic reaction to even the simplest object is a complex and not a simple conscious experience, that it varies from person to person and from time to time, and is modified by both the total personality of the subject and the immediately preceding consciousness. It is necessary therefore to study the æsthetic experience not only in its completed form but in its growth, to treat it not in isolation but in relation to the non-æsthetic attitude antecedent to it.

The introspections of the subjects confirm this view. At first meager and conventional, their accounts became full, independent, and couched in genuinely æsthetic terms. The figures were described as 'soft,' 'quiet,' 'restless,' 'energetic,' 'too tall,' 'too plump,' 'affecting breathing,' etc. On the last day as a control experiment the subjects were asked to judge specifically according to the formal geometrical relations in the figures. This they declared made their judgment forced, artificial, distinctly intellectual and non-æsthetic.

Four constituents of this total complex experience may be discriminated: (1) pre-æsthetic perception, apprehension of the meaning of the object; (2) 'Einfühlung,' the expressional and predominantly

æsthetic aspect; (3) organic feelings; and (4) formal feelings. Lipps is in error in denying the presence of associative factors in mechanical *Einfühlung* or the æsthetic reaction to simple geometrical forms. Associative elements are present in simple as well as in more elaborate æsthetic experiences. It is not necessary to derive the æsthetic from any single source, be it 'conscious self-illusion' or play. It depends upon relations between the perceptual and the reproduced factors, and these may be various. However, in general it seems to depend upon the number and the indefiniteness of the associative or reproduced factors. Segal's subjects testified that vague associations made the experience æsthetic, but that when fully identified they dissipated it.

Contrary to the opinion of Lipps, organic feelings undoubtedly contribute to the æsthetic experience, so long as they do not direct attention to themselves. (Such attention to any of the constituents of a complex experience disrupts that experience as a whole.) The replies of the subjects point overwhelmingly to the presence of organic feelings, due to changes in breathing, muscular tension, etc., in both perceptual and reproductive processes.

Besides these feelings, another type may be recognized, the process or formal feelings, due to ease or difficulty of perception, clearness or obscurity, reasonableness or unreasonableness, and the like. They are intellectual or critical feelings, entering into other types of experience, such as the scientific or the practical. As such they tend to break up the absorbed consciousness of the æsthetic experience.

This suggests that pleasantness and unpleasantness do not depend on corresponding causes, as is usually held, but on opposed. Consequently conclusions reached through an analysis of unpleasantness cannot legitimately be carried over to an explanation of pleasantness. Pleasantness is based on *Einfühlung*; unpleasantness on the formal, non-æsthetic feelings. Modern æsthetics needs to investigate this incongruity between pleasantness and unpleasantness.

To the reviewer the most valuable part of this article is the clear-cut criticism of previous experimental work in æsthetics. The positive positions taken are sound for the most part and in line with current thinking but not especially original or specific. The mystery of '*Einfühlung*' is not yet cleared up, and the treatment of the feeling element seems dubious.

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PERIODICALS.

Psyke, Tidskrift för psykologisk forskning. Edited by SYDNEY ALRUTZ (Upsala), with the coöperation of HARALD HÖFFDING (Copenhagen), ARVID GROTENFELT (Helsingfors) and MOURLY VOLD (Christiania). Subscription price, 5 kr. Stockholm, Albert Bonnier.

This 'journal for psychological investigation' is the first of its kind to appear in the Scandinavian languages. It is announced that it will cover, in addition to general psychology, 'the special fields of religious, criminal, language, art, child, animal, pathological, and abnormal psychology.' From the appearance of the first number, it would seem that the demarcation of this wide scope does not mean that the journal is to popularize, but rather that it would encourage investigations by Scandinavians within such wide fields and give the contributor the greatest freedom in choice of psychological topics.

The articles of the present number are of a high standard, and the editorial staff is sufficient assurance that the journal will have a truly scientific character and a wholesome influence. One must admire the national feeling which leads to the publication of technical work in the languages of these countries, at the same time that one regrets that the language is an unfortunate barrier to the usefulness of the journal in other countries.

Two numbers appeared in 1906. There will be five numbers in each volume. Contents of Number 1: Harald Höffding, 'The concept will,' 5-22. G. Landtman, 'Mental qualifications for the priesthood among savages,' 23-27. Sydney Alrutz, 'Semi-spontaneous manifestations in hypnosis,' 28-60. John Landquist, 'Thinking with emotion,' 61-85. E. Nicolin, 'A case of somnambulism in a dog,' 86.

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PLAY.

Psychology and Philosophy of Play. (II.) W. H. WINCH. Mind, 1906, XV., 179-190.

In the second part of his essay,¹ Mr. Winch deals with the philosophy of play, discussing briefly the surplus energy theory, the preparation theory and the recapitulation theory, after which he gives his summary and conclusion.

In support of the surplus energy theory he quotes H. R. Marshall as saying that 'plays are occasioned by the diversion into certain relatively definite channels of surplus . . . energies,' the result of hyper-

¹ Cf. PSYCHOL. BULLETIN, III., p. 242.

nutrition, which have had no opportunity for active expression. From R. Wallaschek he quotes: "It is the surplus vigor in more highly developed organisms exceeding what is required for immediate needs, in which play . . . takes its rise manifesting itself by way of imitation or repetition of all those efforts . . . which are essential to the maintenance of life."

This conception appears clear. But is the manifestation of this surplus vigor a repetition of the efforts essential to life?

Mr. Winch does not consider Spencer's idea, that the 'pleasurable consciousness' is the work habit, to be representative of typical play, but rather work for work's sake. He holds that energy can but to a limited extent be drawn from work to play, and concludes that the surplus energy theory does not cover the facts.

The preparation theory, says Mr. Winch, attempts to account for the forms which play assumes, as the surplus energy theory shows the conditions of the possibility of play.

Quoting Marshall and P. Souriau, who hold that we have natural tendencies for the guidance of energies into practice which will be valuable to us in later life, Mr. Winch asks if the essence of play rests in the fact that it is preparatory to serious work. We know that human beings need such preparation for life work that play-time must be limited. Mr. Winch questions whether our knowledge is exact enough to enable us to decide if the playful activity of the young is an aid or a hindrance to later needs. He concedes, however, that the spontaneous activities of the lower animals seem to be preparatory, while those of man do not to the same extent. His explanation is that 'we consider the play of animals destined to the same life their ancestors led, while the changing environment of man demands new operations and readjustments.' Beliefs have the same general results as actions, primitive beliefs and their decay finding an analogy in the rudimentary organs of man, decaying, yet sometimes functioning strongly, and requiring sustenance.

Children's song-games remind us of the childhood of the race, when man worked by the coöperation of all his faculties.

Mr. Winch points out the inconsistency of Professor Groos's statement, that play serves to tone down present instincts rather than to strengthen them or create new ones, with his theory of play as a 'divinely appointed preparation for the work of life.' That young animals exercise organs in embryo before serious use gives them a 'survival value,' and that play is *Vorübung* (preliminary practice) or *Einübung* (preparatory practice) of embryonic organs, is an intel-

ligible hypothesis; but the trouble is to maintain it and the idea that play is to ease the decay of the old, and not to strengthen developing instincts.

While Professor Groos counts love-plays performance and not play, Mr. Winch classifies flirtation of human beings from childhood up as play, seeming to him to be practice for serious activity. The distinction, however, between preparation and exercise is difficult. "Is a boy playing with a gun exercising his soldierly instinct, or is he only preparing to exercise it?" Marginal cases, however, are always to be looked for.

The preparation theory considers play as a divinely appointed means of preparation for the functions of adult life, and as the evolution of man and the higher animals depends upon a long-continued adolescence, this theory seems plausible. It is worth while to compare it with the underlying conceptions of precocity.

Many precocious persons seem to be preparing in early childhood for the function of adult life. Psychologically such activities might be called play; but they are not *Vorübung* or *Einübung*, but *Ausübung* (execution) and cannot be appropriated by the preparation theory.

Evolutionary progress, according to this theory, demands a long period of play time before beginning the work of life. In the case of genius, however, life work begins early. This cannot be charged to the abnormal character of genius, for men of ability, though they do not specialize early, show early devotion to work, and intentional preparation for life, differing from the spontaneity of play. It is not easy to fit these facts with the preparation theory.

Mr. Winch concludes that all these preparations of adolescence are not the preparation of play; and that they are valuable as affording a long time for comparative plasticity which favors deliberate education.

Considering the recapitulation theory, Mr. Winch insists that 'if we hold the doctrine of biological recapitulation at all, we must . . . connect the spontaneous activities of childhood with a preceding stage in adult work and thought.' But to hold recapitulation as an empirical law is one thing, and to declare its necessity another. Professor Marshall says that in biological study there is an effort to escape the necessity of recapitulation. And Professor Miall insists that 'adaptations tend to be inherited at corresponding phases in the ontogeny and the phylogeny.' The conclusion is that recapitulation in biology will not cover the whole ground.

In conclusion Mr. Winch proposes to show whether or not there is any spontaneous advance.

According to the pre-Darwinian biology, a perfect being according to the law of his species would be the result of each individual development, granting liberty and sustenance. Thus unimpeded development, spontaneity and liberty became ethical ideals.

A great revolution was brought about by Malthus, and by Darwin with his doctrine of the Origin of Species. The moving force was spontaneous variation, but it might occur in more than one direction. Environment decided which should survive, and unimpeded development gave place to fight for existence. Correlated with their conception was the surplus energy theory, and their educational sequence the 'exaltation of competitive examination, and payment by results.' The dogmatic assertion followed: 'Ontogeny repeats phylogeny.' From this we have a 'logical bifurcation'; 'the child must pass through all these stages at a certain rate,' or 'the child shall linger as short a time in primitive stages as possible.' This theory requires that the spontaneous activities of childhood shall be recapitulatory.

The thought of today rejects both absolute liberty and equality in strife. The meaning of the survival of the fittest is shown to be the survival of the survivors, survival being the test of fitness; and 'limitation to biological recapitulation, physiological short-cuts and instinctive plasticity rather than instinctive reflexiveness, are dominant notes of latter-day science.' Impulse and instinct are no longer counted divine leaders.

On the other hand, recent work appears to demonstrate a trend in variation, showing it to be not indifferent in direction; although we have lost that faith in 'the inheritance of acquired character' which was one of the strong points of 'mid-century optimism.'

Mr. Winch regards play valuable as a brake. Mental life calls for periods of physical recreation by making little demand on the high nervous centers. Guilds of play are founded upon the view not of the divinity of natural play, but that plays may be devised to satisfy the longing for beauty, and to be an outlet for the desire for motion, while precluding all expression of low tastes.

It is for us so to employ play that it shall be 'relief from work,' and not a descent into barbarism; a means of maintaining that physical vigor so difficult to hold in the strenuous life of today; a suggestion of mental development in which 'we may find the earliest lines of approach for adult work and thought.'

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CHILD PSYCHOLOGY.

Imaginative Elements in the Written Work of School Children.

S. S. CALVIN and I. F. MEYER. Ped. Sem., 1906, XIII., 84-93.

Three thousand children in the grades and in the high school were asked to choose a subject from such topics as the following and to write upon it: A Funny Story I have Heard; A Poor Family; How Flowers Were Colored; A Fairy Story; A Voyage in an Air Ship in the Year 2000.

The results according to the various kinds of imagery were graded and tabulated. Visual images lead, followed closely by auditory, motor and tactile, and remotely by pain, gustatory, organic and olfactory. The most marked change with age is the drop in all except visual imagination at puberty after a continued rise to that point, and followed by a partial recovery during the high school period. The authors explain this by the general upheaval that accompanies the onset of puberty. 'Visual imagery' is more intellectual and hence is less affected. In harmony with this is the increase in scientific imagination and the correspondence between increase in visual imagery and increased correctness of expression.

All change in sense imagery is in general the same as has been found in sensations. Of complex forms of imagination, the heroic (courage, devotion, etc.) is highest, though it declines with age, especially just at the onset of puberty (14.77 average age for boys). Dramatic imagination (striking situations) ranks next with a similar curve. Scientific imagination (relating to machines, inventions, etc.) increases with age. The mythopæic (relating to myths and fairies) decreases with age. Religious imagination is highest in the fifth grade, probably because older children are more reticent in expressing religious feelings. Melancholic imagination (feelings of sadness and depression) is more prominent at puberty, especially with girls. Logical power grows with age, corresponding to increase in visual imagery. The sense of humor reaches its climax in the seventh grade, as do also the pain images. The lack of marked increase in images of feeling at puberty, when emotions are supposed to be especially strong, can only be explained by the repressive influence of school environment. No details are given as to the method of tabulation, *e. g.*, it is not stated whether choice of subject was a large factor in determining imagery at different ages (which would naturally be the case if the topics were not tabulated separately).

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JUSTICE.

Some Contributions of Psychology to the Conception of Justice.

JAMES H. TUFTS. *Philos. Review*, 1906, XV., 361-379.

Definitions of justice proceed from the standpoints of both the individual and of society. Since psychology deals with individuals and society as representing individuals, it can aid in getting a conception of justice. Such a conception would take account of the character of individuals as to origin and structure and of society as an interdependence of individuals. The problem is to get impartiality and uniformity in place of caprice. Abstract equality is real inequality. Full justice includes personal equality. The present scheme of distribution of property depends upon custom and tradition. Society asks about the mode of acquisition and it has the welfare of individuals at heart and takes equality as basis for distribution of goods. Equal distribution must consider deserts, efforts and needs. A second view regards the economic process as a contract between free individuals, and society has no concern in the contract. Possession is a legal right for continued holding. This is unjust, as property is acquired under conditions which must be accepted. The complexity of the life of individuals makes distribution unjust. The Americans prefer a society in which there is chance and an opportunity for large stakes to a society in which what is got is what is put in. Full development during school life must be given every individual. It is objected that awakened desire causes misery, but such a view is contrary to democracy.

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ATTENTION.

The Given Situation in Attention. F. ARNOLD. *Jour. of Philos., Psychol. and Sci. Meth.*, 1906, III., 567-572.

Arnold's attempt is to state an old problem in terms more up to date than the traditional ones. Following Dewey, our objects of perception and imagination are called the 'given situation.' The concept or term 'point of juncture' or 'connection between the self and not-self' is introduced as basal, and images are said to have fewer 'points of juncture' than perceptions and to have them 'differently stimulated.' But they too 'have reality back of them.' A little further on, the 'given situation' and the 'points of juncture' are identified, but this is probably a slip, since it would make the earlier statements meaningless. These 'points of contact' may differ in kind, giving rise to the different kinds of objects of which we are aware (visual, auditory, etc.).

Later we are told that the given situation includes both the self and external reality, though whether this means the self and its object, *i. e.*, the juncture, or the self and the not-self, *i. e.*, the 'reality back of' the juncture, we are not informed.

However, having a certain 'given situation,' the self, by its power of activity, may add to it, or supplant it by a second: having a certain 'juncture' or connection with the not-self it may make certain other 'junctures.' This is called the 'development' of the given situation, and attention is defined as the 'entire subjective aspect of the given situation under development.'

Translated as far as possible into definite terms, the theory seems to be an old acquaintance in masquerade. The fundamental realities are an active self and a real external world. The action of the self on the world or *vice versa* gives rise to a third and derivative reality called the object of consciousness. By its inherent activity the self can modify the production of this phenomenal object, which process of modification is the change of attention.

In the conclusion of the paper the author adds that to treat the subject properly, we must consider attention in '(1) its sensory aspect, (2) its ideal aspect, (3) its motor aspect, (4) its physiological aspect and (5) its mental field.' Why the other features commonly treated by psychologists along with these are excluded, is not indicated.

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THOUGHT-READING.

Les procédés des liseurs de pensées: Cumberlandism sans contact.

L. LAURENT. *Journal de Psychologie*, 1905, II., 481-495.

In this paper Dr. Laurent presents the results of experiments upon the species of mind-reading known as Cumberlandism. The method with contact is first described. From test variations it was shown that the most efficient contact is obtained when the experimenter or 'guide' places his hand between the shoulders of the subject or 'agent.' The guide then attends earnestly to the task he has selected to have the agent perform, such as finding a pin placed in a certain part of the room. The concentration of thought with which the experimenter regards the object to be sought occasions involuntary movements of his hand which, unconsciously felt by the subject, impel him toward his goal. Assuming this to be to the right, the subject moves toward the right until, exceeding the limit indicated, he is checked by a movement in the reverse direction. Following thus a method of

dichotomy, the successive vacillations become less until the object is finally obtained.

The account thus far seems plausible enough, but where the discriminations involved in the finer muscular coördinations are called for, such as picking up the pin or flipping it aside, the explanation becomes inadequate. For the author is not to be assumed as implying that an indication of movement at the point of contact may thus be conveyed to muscles structurally and functionally remote from it, yet there is lacking in the text any definite statement to preclude this inference.

Of Dr. Laurent's experiments especial interest attaches to those performed under conditions in which contact has been eliminated. Here the guide, standing at a distance of several meters from the agent, directs his thought, as before, to the appointed task—preferably a simple one and easily understood, such as the choice of an object upon a table. In this way repeated tests were made with the result that the transmission of thought without contact, hitherto discountenanced in the scientific mind because of its association with the spectacular representations of the popular spiritualist, appears worthy of elevation to the rank of established fact.

As to its interpretation the account is briefly this: The idea of every act manifests itself unconsciously in an automatic sketch of the act; the more intense the idea, the more exact the sketch. If the desire to transmit an idea be intense, there is an unconscious tendency of the entire body toward movements appropriate to the idea intended, so that there surges to the lips, correlatively with the involuntary muscular impulse in cases of contact, the verbal image of the words in which the command would be formulated if consciously expressed—this verbal image being strongest in persons whose memory is of the verbal-motor type. That the subject should divine the suggestion of the guide, when to the bystanders, alert for any word escaping him, no sound is perceptible, is ascribed to the heightened power of audition characteristic of subconscious attention. The subject, having his attention completely engrossed in the command which he awaits, is placed through inhibition in an absolute silence, being deaf to all irrelevant sounds and indeed insensitive to every impression save the single command to which his expectant attention is riveted. To this supersensitive audition Dr. Laurent gives the name 'hyperacousie.' The attention of the subject is first obtained through an effort of the will, but this conscious effort sinks into abeyance and is gradually replaced by an increasing degree of automatism, as repetition confirms the habit of subconscious action. The more complete the subconscious

state of the agent, the more accurate is his fulfillment of the task. The author presents the view that motor response is far more active to subconscious than to conscious thought, and that, therefore, the mimic portrayal of subconscious thought is proportionately more accurate than that of an effort of thought consciously directed.

A point of interest in these experiments is the greater susceptibility of the nervous and hysterical, whether in the rôle of agent or guide, the explanation consisting apparently in the restricted field of consciousness characteristic of the type, whereby the suggestion so completely floods the consciousness as to give to it the force of an irresistible obsession.

While the author's good faith in the conduct of his researches is beyond question, he fails to give a satisfactory report of the measures adopted to control his experiments—they are tacitly implied, rather than explicitly shown. The paper is throughout more descriptive than critical, the number and variety of the phenomena recorded appearing disproportionate to the meager evidence adduced in support of them. Further, there is no mention of the work of Hansen and Lehmann, directed along similar lines and reported in *Philosophische Studien*, Vol. XI., 1895.

However, Dr. Laurent's investigations into the phenomenon of thought transference without contact have contributed to establish its title to legitimate inquiry and to give an impetus which should direct further studies along these channels.

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WORK AND FATIGUE.

Le travail, la fatigue et l'effort. Z. TREVES. Année Psychologique, 1906, XII., 34-69.

This article is a résumé of the recent ergographic investigations. The following topics are discussed: (1) The conditions of maximal work. (2) The way in which the curve of work is presented according as it is obtained by electrical or voluntary stimulation. (3) The curve of work as expression of corresponding neuro-muscular fatigue. (4) The elements that should be studied in the curve of voluntary work and the way in which these elements vary with the different conditions under which the work is performed. (5) The relations existing between useful effect, fatigue and effort, in the course of rhythmical work.

A bibliography is appended.

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DISCUSSION AND REPORTS.

EYE-MOVEMENTS AND VISUAL DIRECTION.

Mr. Coyle, in his brief paper in the last issue of the BULLETIN¹ has pointed out an error on the part of certain supporters of the eye-movement theory of visual direction. He makes it evident that an upward movement of the eye may bring into clear vision the upper part of an object, and a downward movement the lower part, even with an *upright* image, under certain special conditions. These conditions are, that the entire set of lenses which give the upright image be attached to the eye itself, or included within it, and move with all the ocular movements. And consequently the statement by the eye-movement theorists that the inverted image, instead of offering a difficulty, is the one necessary condition of appropriate eye-movements, is mistaken. Mr. Coyle has thus helped to weaken what we might call the *a priori* deduction of the inverted image by the supporters of this theory; although leaving of course untouched a similar 'deduction' by the retinal-projectionists.

Some may perhaps feel that the eye-movement theory thus cleared of an illogical encumbrance is much strengthened, and is no longer open to the objections which my own experiments on upright vision may have seemed to offer. Mr. Coyle himself does not say this in his references to my work, and I would not be understood as offering any objection to his own excellent discussion. But it may not be amiss to point out that the arrangement of lenses which he describes, and which he shows would provide all that is required for an eye-movement explanation of visual direction, is not at all the arrangement under which my own experiments were carried out. In my case the lenses were attached to the head, or when mirrors were used they were fastened to the shoulders, and of course not to the eye-balls themselves; and consequently the eyes moved in the same independence of the lenses or mirrors as when ordinary eye-glasses are worn. During these experiments, therefore, *the ocular movements were not at all what the eye-movement theory would require, but the very opposite*. When the observer looked through the inverting lenses at the face of some one standing at a distance in the room, and wished to look instead at his feet, the front of the eyes had to move not downward but upward. And if the eyes were to view in succession the parts of a table

¹ *Upright Vision and the Inverted Image*. PSYCHOLOGICAL BULLETIN, Vol. IV., p. 97.

from base to top, they had actually to move *downward*. Since, in spite of this, there was a growing harmony between the directions of the field of view and those of the observer's organic sensations, it seems to me that the eye-movement theory, even in its new and purified state, cannot escape unscathed.

And for those who are not concerned especially for the eye-muscles, but who are inclined to attribute the visual space-quality to motor sensations of some kind, it may be well to recall that in those wider sweeps to right and left, when head movements were required and the sensations from the neck and shoulders ought to have controlled the feeling of direction, they actually failed to do so. The field of view here sweeping in the same direction as the head movements, but still more swiftly, brought it about that when one was most at home in the unusual experience *the head seemed to be moving in the very opposite direction from that which the motor sensations themselves would suggest*. Taken in connection with the subsequent experiments with mirrors, and with the evidence drawn from ocular photography, it would still seem that the accounts of vision wherein its spatial features are attributed so predominantly to motor sensations are hardly able to stand the strain of fact.

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While I am not among those who 'attribute the visual space-quality' *solely* 'to motor sensations of some kind,' I must take issue with Professor Stratton on one point.

Mr. Coyle's argument was directed primarily against the faulty analysis of the direction of eye-movement in an eye supposedly fitted for non-inverted retinal images and against the deductions based thereon. In such an eye, according to Mr. Coyle's demonstration, to see an object above the level of the head the front of the eye must be turned upward just as in the ordinary eye.

In Professor Stratton's experiment, as he points out above, the lenses were attached to the head, not to the eye-ball, making a third case. In consequence, to see an object above the level of the head the front of the eye must now be turned *downward*. That in spite of this fundamental shattering of old associations the observer was able after a time to coördinate his visual space with the touch-muscular space, seems indeed to demonstrate the *empirical* nature of the space coördination. But it does not, so far as I see, furnish any argument against the role of *motor sensations* in the coördination. Whether *B* be above or below the line of regard, 'by contraction of the proper

eye muscles we move the eye so that we will perceive *B* more and more distinctly,' and this is 'independent of what may happen to be the absolute motion of the eye,' to quote Mr. Coyle's words. In any of the three cases, the contraction of the eye muscles proceeds regularly, as the fovea fixates point after point in the field, and the arguments for the eye-movement theory hold quite as well if the front of the eye move *down* to see *up* as they do for the normal eye. In the new case we would call a certain direction *down* (as Professor Stratton learned to do during his experiments) because it was the direction of our feet in the visual scheme, or because objects fell in that direction. The *progress of muscular contraction* and of muscular sensations during a given alteration of the foveal image would be similar in all the cases; only the *role of the superior and inferior muscles* would now be interchanged.

If, now, head movements be added, we have merely to coördinate the sensations from new pairs of muscles with the eye-movement sensations. Professor Stratton believes that 'the sensations from the neck and shoulders ought to have controlled the feeling of direction' in his experiment, on the motor theory. Is there not rather involved the building up of a new coördination between two quite independent sets of motor sensations? I can speak with some assurance on this point, from having experimented myself at some length on writing while looking at my hand in a mirror. I found that after some practice I was able to *feel* the movement in the direction in which it seemed visually to occur. The motor element was *unchanged in amount* but *reversed in direction*—that is, the visual effect connected normally with one set of muscles was now connected with an antagonistic set. Here, as in eye movement, the arguments for the motor theory of space perception are, it seems to me, quite unimpaired (*and also not strengthened*) by the experiment.

The purpose of Mr. Coyle's paper, however, was not to support the motor theory. It was rather to point out an error in reasoning which had resulted from neglect to draw figures and work out the actual eye movements in the case under consideration. The same argument had been repeated time and again without challenge so far as I am aware; and it remained for an undergraduate student to discover the underlying fallacy, by *weighing the fish*.

H. C. W.

I fully agree with Professor Warren that the facts presented by me are not evidence that our motor sensations have no part whatever in vision; I had no idea of offering them as such. They do, however,

make it clear, it seems to me, that visual *direction* is not of itself a feeling of the *direction* of the movements of the eye, — whether of its front, or of its muscles. If a pull of certain ocular muscles toward the back of the head, and a depression of the cornea toward the feet can come to suggest to us a position in space above the head, it can hardly be thought that our sense of this upward position is derived from the felt character of the eye-movements. The visual direction cannot be said to be carried over, by a kind of irradiation, from them. They are, the rather, dominated by other influences, which give a sense of direction the very opposite of what the muscular sensations themselves would suggest. This of course does not mean that motor impressions play no rôle whatever; but only that, so far as the *sense of direction* in vision is concerned (and it was with direction that the eye-movement theory of upright vision was busied) their rôle would now seem to be merely what actors sometimes call a ‘thinking part.’

G. M. S.

NEW YORK SECTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION.

A joint meeting of the Section of Anthropology and Psychology of the New York Academy of Sciences and the New York Section of the American Psychological Association met in New Haven at the Psychological Laboratory of Yale University on Monday, April 22. There was an afternoon session at 3:30 and an evening session at 8. The afternoon session was opened by R. S. Woodworth, who described a method by which differences in order, or the relative position of the members of a series, could be measured and expressed in terms of deviation from a standard order. He showed how such a method might be used in memory tests and in correlation of individual differences. This paper was followed by a report from F. N. Freeman of a study of reactions by graphic movements which was carried on as preliminary to a general study of writing reactions. F. Lyman Wells next presented a paper on the validity of individual judgment as measured by its departure from an average and a comparison of the explicitly recognized standard of judgment with the standard actually employed. The paper by W. C. Reudiger which closed the afternoon session was a report of an investigation by the questionnaire method concerning the various types of mental reconstruction accompanying development and their distribution and accompanying conditions. This mental reconstruction was distinguished from reconstruction in religious experience.

The evening session opened with a paper by E. L. Thorndike in which were reported experiments in memory, in which the foreign equivalents of the native language were memorized, instead of nonsense syllables. Transference of practice was found in some degree and a much longer persistence of memory than in the case of nonsense syllables. The next report was of an investigation of the weight illusion by H. N. Loomis. This illusion was studied by taking a graphic record of the movements made in lifting boxes of equal weight but unequal size. It was found that the larger box was attacked with much more vigor than the smaller one. Then followed a paper by J. McK. Cattell on the distinction between perceptions and images. The greater subjective vividness of perceptions he ascribed to the greater intensity of the motor response attending them than that which attends images. He supported his conclusions by the consideration that experiences which are normally subjective become objectified when accompanied by intense motor response as in the case of hallucinations. The last paper, by W. P. Montague, consisted chiefly in a criticism of the Humanistic account of truth as set forth by Schiller. As contrasted with the view that the criterion of truth is the value of its consequences, the 'common sense' view that truth consists in point to point correspondence of a proposition with fact was defended provisionally. A brief discussion followed each paper.

FRANK N. FREEMAN.

YALE UNIVERSITY.

BOOKS RECEIVED FROM APRIL 5 TO MAY 5.

The Numerical Proportions of the Sexes at Birth. J. B. NICHOLS. (Memoirs of the American Anthropological Association.) Lancaster, Pa., New Era Co., 1907. Pp. 247-300.

The Kingdom of Man. E. RAY LANKESTER. New York, Holt, 1907. Pp. xii + 191. [Collected papers, among them the author's recent presidential address before the British Association, on the 'Advance of Science.']

Dictionnaire de philosophie ancienne, moderne et contemporaine. Abbé E. BLANC. Paris, Lethielleux, 1906. Pp. xvi + 1247. [An important work by a Catholic authority.]

Handbook of American Indians north of Mexico. Ed. by F. W. HODGE. Part I. (Bull. No. 30, Bureau of Amer. Ethnology, Smithsonian Institution.) Washington, Gov. Printing Office, 1907. Pp. xix + 972. [Illustrated and arranged alphabetically, constituting a dictionary of Americanism.]

Reason, Thought and Language, or the Many and the One. D. MACLEANE. London and New York, Froude, 1906. Pp. xvi + 583.

NOTES AND NEWS.

PROFESSOR JAMES H. LEUBA, of Bryn Mawr College, is going abroad in June on leave of absence for a year. Mr. C. E. Ferree, now assistant in psychology at Cornell, has been appointed lecturer in psychology at Bryn Mawr, and Miss Grace Fernald, who takes her degree this year at Chicago University, is to be laboratory demonstrator. Mr. Ferree is to remain at Bryn Mawr on Professor Leuba's return.

PROFESSOR A. T. ORMOND, of Princeton University, has recently visited a number of institutions in the South and delivered lectures on various philosophical topics.

IT IS proposed to reprint Dr. Seguin's work on *Idiocy and its Treatment by the Physiological Method*, provided sufficient subscriptions are secured. The project should appeal to those interested in abnormal psychology as well as physicians. (Subsc. \$1.75; Publication Board of Teachers College, Columbia University, N. Y.)

From May to September 15, MS. communications, etc., for the PSYCHOLOGICAL BULLETIN (as well as for the REVIEW) should be addressed to

EDITOR OF THE PSYCHOLOGICAL REVIEW,
Johns Hopkins University,
Baltimore, Md.

THE PSYCHOLOGICAL BULLETIN

THE PSYCHOGENIC FACTORS IN THE DEVELOPMENT OF PSYCHOSES.

BY DR. AUGUST HOCH,

Bloomington Hospital, White Plains, N. Y.

If we look through the text-books on psychiatry or even such a work as that of Toulouse which treats only of the causation of insanity, we cannot help being impressed by the fact that, although mental causes may be discussed at considerable length this is usually done, one might say, in a perfunctory manner and without full appreciation of their importance. In a rather one-sided interpretation of the dictum: 'mental diseases are brain diseases,' the conception is tacitly implied that the brain, in mental diseases, must be the seat of chemico-physical or anatomical changes, which only secondarily can lead to mental abnormalities; and consequently there is in the air the idea that we have to look chiefly for physical causes of insanity, or at any rate, for mental influences only in so far as they act through the medium of physical deviations. In reality it is impossible to gain a safe theoretical standpoint and it is wise to keep one's mind open for facts; and, if theoretical considerations make us overlook these, it is time to free ourselves from generalizations which now, at any rate, are no longer especially helpful, whatever purpose they may have served in earlier times. As an outcome of the tendency above mentioned we find a marked inclination to explain symptoms as much as possible on a localization basis, as in the conception, *e. g.*, that hallucinations are irritative focal symptoms. And I think we are not mistaken if we regard as arising from a similar ground-work the desire to find one general disorder (*nota bene* not a general principle) as explanation of a psychosis, a general disorder which can be attributed to a diminution, or increase, or a perversion, of certain brain activi-

This number, dealing especially with psychopathology, has been prepared under the editorial care of Dr. Adolf Meyer.

ties. To this group belong such theories as the explanation of paranoia on the ground of a defect of apperception (Berze), or of a general change in the emotional tone (Specht); or such theories as Janet's diminution of mental tension; perhaps also to a certain extent the theory of dissociation of the *noöpsyche* and *thymopsyche* (Stransky) and many others, which leave out the issue of *development* of symptoms.

I have, of course, no desire to discuss here the relation between the chemico-physical processes of the brain and the mental functions. I wish only to point out certain tendencies which have of late made themselves felt in psychiatry and according to which, in some diseases, the psychogenic factors are given more weight in the development of mental deviations than has been customary. This tendency is not based upon theoretical considerations but upon practical experience, gained from analyzing disease symptoms and the lives of patients, their mind habits, their struggles and their mental undercurrents; and comparing these pathological deviations with variations within the breadth of normal mental activity.

In spite of the general tendency to neglect mental causes there is one disorder in which the mental causes always have been pushed more to the foreground, namely, the anxiety melancholias which occur more especially in advanced years. The reason for this fact is plain enough. The central feature of the clinical picture is here strikingly in accord with the mental causes so frequently found, the anxiety and uneasiness is the result of circumstances which naturally would produce fretting in anyone. The conflict, therefore, which existed before the breakdown and the reaction to this conflict, are still present in the disease itself. That such a clear relation is not observable in other conditions is evidently an important reason for the relative disregard of mental causes in psychiatry.

We owe to Freud the impulse towards the appreciation, and the demonstration of principles in normal and abnormal life which help us to recognize in other psychoses similar closer relations between cause and effect as we do in the anxiety melancholias, above mentioned, with the distinction, however, that these relations are here often much less transparent.

It has been shown that internal conflicts, longings, and the like, influence mental processes in various ways, and this without any interference of will and often without our becoming conscious of the source of the influences. Freud has demonstrated that such common experiences of our everyday life, as the forgetting of names, words, or incidents; also slips of the tongue or pen, mistakes in reading,

thoughtless acts; or again the random selection of names or figures—acts which are apparently accidental or purposeless and which occur when the attention wanders—may have a distinct connection with mental trends associated with marked affects. He showed that they are not accidental happenings, but that, when we trace them back to their origin, we may find at work either instinctive attempts to forget unpleasant experiences or associations or instinctive attempts to work out in other ways our desires. In other instances such mistakes are evidently determined merely by trends of thought which have been recently prominent in mind, without the character of either suppression or working out of desires being at all in evidence. Just as in conscious activity, reminiscences are called up by many associations, so may here undercurrents be called into action from all sorts of avenues but without our becoming conscious of them.

Jung has found that the influence of such undercurrents can be demonstrated in the results of association experiments in which stimulus-words which touch such undercurrents produce either a delay of the reaction or various qualitative peculiarities in the associations evoked. This he interprets on a similar principle of suppression. Memories which are connected with strong feelings together with a greater or lesser number of their associated ideas are submerged or inhibited, consequently ideas which are associated with undercurrents are not supplied with the same readiness as indifferent thoughts. To a certain extent this may also be explained by an inhibiting influence upon mentation which undercurrents may exert in the same way as actual affectful experiences, with the distinction that in the case of the undercurrents the idea remains below the threshold of consciousness. These studies of Jung have therefore confirmed some claims of Freud and have given us a method for demonstrating experimentally the existence and the nature of undercurrents, and to a certain extent for gaining an idea of their intensity and abundance.

In the mental tendencies thus far enumerated certain instinctive attempts at getting away from the unpleasant have become evident. Many other tendencies of a similar kind can be shown to exist. Bleuler has pointed out the fact that, if we read over our diaries of former days, we find that our recollection has changed the events in a manner which suits our desires better than the actual occurrences as recorded. We may also mention the fact that we have a tendency to instinctively blame others if anything we do goes wrong, because we wish to rid ourselves of the discomfort thus created; or, the many substitutive activities to which we resort in order to relieve unsatisfied longings; or day dreaming, etc.

Very important in this connection are our dreams which Freud has studied extensively. In his analysis of dreams he became convinced that the dream is not merely 'a somatic process which manifests itself in the mind,' nor that in the dream state, some sets of ideas are asleep, others not, etc., but that we dream only of things which concern us deeply. His study brought him to the conclusion that the dream developments represent a fulfilment of wishes, that is, on the one hand, a satisfying of longings, and on the other a ridding ourselves of unpleasant experiences or a conversion of them into pleasant ones. The reason for this Freud sees in the sleep-guarding function of dreams, which have to suppress the disturbing thoughts or rob them of their disturbing elements. Whatever we may think of Freud's generalization he certainly gives excellent examples in his book in which the principle of the fulfilment of wishes is very plausible. Of great interest in relation to psychiatry is also the fact that in dreams the undercurrents appear much disguised in the garb of peculiar, and at first sight unrecognizable, symbolizations.

We see then in all these examples taken from normal life how ideas which deeply concern us influence our mind in a manner which is not yet generally appreciated. We have found that such ideas, conscious or unconscious, may exert an inhibiting influence upon the mind and it has been shown that there exists various automatic mechanisms or tendencies, or whatever we may call them, which tend to bring about a certain adjustment to our difficulties. We shall see, however, that these tendencies are not without their dangers and that it is in this direction that pathological deviations may develop. The *essential* means which the normal individual uses to get square with conflicts are of a different sort. I refer to the many healthy mind habits and reactions such as the formation of healthy interests which allow us to turn away from our own difficulties, or a sense of correct values, or the habit of clear thinking and clear feeling, or an aggressiveness which shapes conditions around us to a certain extent, or a wholesome unburdening, and many others; in a word, all those healthy mind habits in which the normal personality asserts itself and counterbalances the formation, growth and accumulation of undercurrents.

If we now turn to the pathological conditions we find the same principles at work, only in much exaggerated form. Freud has shown what a great rôle the mechanism of displacement, that is, of forgetting or suppressing unpleasant memories, plays in both hysteria and obsessions, and how the suppressed undercurrents influence the mental activities in a great variety of ways. Although the disturbing memory

may be wholly forgotten so far as the facts are concerned, the affect, the fear, or the depression or the uneasiness may persist or crop up and be then associated with ideas and happenings, the content of which is curiously incongruous with the disturbing emotions. Or peculiar substitutive activities may be instinctively chosen either as a result of suppressed or conscious disturbing factors. All this may be comparatively transparent or it may be covered up under the guise of symbolisms. Such activities are then apt to occur with imperative force. In this connection the example of a boy, a patient of Freud's may be mentioned, who, every night on retiring had to go through a complicated set of actions. These, it was found, had a clear relation to a sexual traumatism which was submerged and the actions represented means of defence against such an occurrence. It was an attempt, therefore, to find relief from the effects of the disturbing experience. In hysteria the suppressed complexes of ideas of this kind may also manifest themselves in various ways. Ricklin described a case, for example, in whom many physical symptoms which otherwise could not be accounted for were, under hypnosis, traced back to various experiences against which the patient's feelings revolted. It was then found that the relation between the symptoms and these experiences was a perfectly evident one, but the patient herself was unable to account for the symptoms or made use of subterfuges very much in the same way as a person acting out a posthypnotic suggestion does. Similar conditions are often found. The symptoms may be more or less persistent or may only appear when the undercurrent is somehow touched and when the actual recollection is kept from rising above the threshold of consciousness; then the more indifferent, more admissible physical symptoms, or ideas which are sufficiently disguised not to betray the undercurrents, manifest themselves. In the same way delusions, hallucinations, deliria may appear in hysteria and here, as in other psychoses, the range of possibilities which, one might say, is only bounded by the possibilities of imagination, is very great and accounts for the multiplicity of symptoms. The principle often seems to be that the symptoms are the direct result of suppressed, or conscious conflicts and longings, or often represent instinctive, not of course voluntary attempts at getting away from the unpleasant, or seeking that which gives ease or fulfils longings. A girl, recorded by Bleuler, after having in vain waited for her lover who deserted her, got into a state of delirium in which she imagined that the lover had arrived, hallucinated the occurrences which represented this fulfilment of her desire and interpreted the surroundings in accordance with it. Traumatic

hysteria has in part been explained as a more or less unconscious desire to be sick in order to obtain the compensation and a similar explanation has been given to the peculiar simulation of insanity called the Ganser symptom-complex. Just as sets of memories with their associations may be thus suppressed and exert an influence upon the conscious mind, so may larger parts of the mind be split off and dominate more or less fully the activities of the personality.

I may here mention a case who in reality belongs to the group of dementia præcox, but whose delusions represent in such a clear manner a pathological attempt at getting square with a conflict that it may well serve as an illustration of the possibilities which we have to expect. I will describe only a few of the features of the case. The patient was a married woman who became infatuated with another man than her husband. She blamed herself severely for this and finally, as a result of the conflict caused by her infatuation and her sensitive moral nature found a relief in the substitutive mental trend of having a mission to show the world how to live a pure life, while at the same time the two incompatible personalities, the husband and the man with whom she had become infatuated became fused into a mystical combination of which she spoke in vague terms as 'two in one.' She presented, moreover, what appeared to be a purposeful vagueness or shirking of any reasoning in her utterances and thoughts referring to her mission and her conflict, whereas in other respects she was clear enough. The secondary delusions of grandeur, in paranoic states, evidently find a ready explanation upon the same principles.

Bleuler has claimed that if we carefully investigate the histories in cases of paranoia (he limited himself to the Kraepelinian type) it is possible to show how here, too, affectful experiences and conflicts play an important rôle in the genesis of the delusions and how such ideas and complexes of ideas finally dominate the mind so that many occurrences are of necessity associated with the predominating ideas and a fictitious relation is brought about which gives rise to the so-called delusions of reference. He points out, moreover, how the delusions are not different from errors of everyday life nor formed upon different principles. My own experience with various other types of paranoic states shows this to be true in them as well. One often finds that the analysis of the clinical picture leads one back into the normal period of the personality in which we encounter the same sensitiveness on certain matters, the same disharmonies, and conflicts which in further development have become dominant and have given rise to various results which have their prototypes in normal life. Indeed, it is the

paranoic states (the term being used in a wide sense) which furnish a large material in which only the principles discussed in this review give us the key to the situation.

Dementia præcox is one of the most difficult problems in psychiatry and it will be a long time before we shall be able to fully understand the symptoms, and the principles which underlie them. Nevertheless, there are early and comparatively transparent cases in whom the same mechanisms seem to be at work. Jung in his remarkable work upon the psychology of dementia præcox has shown us how so many of the symptoms may thus be explained, as, for example, the 'blocking' in its various forms, the hallucinations and delusions, the delirious phases, a part at least of the disproportion between the affects and ideas, the substitutive activities, etc., and he has even made it very probable that the peculiar speech confusion may be largely dominated by a few sets of ideas which manifest themselves in various symbolizations, substitutions, fulfilment of wishes, etc. There is of course much in dementia præcox that remains unexplained, and it is difficult as yet to see the reasons for the grave deterioration. Nevertheless, the results of Jung, and the fact that we find transitions from the more transparent paranoic states to the graver deteriorations makes it probable that many features of this disease belong to the category of phenomena we have here been discussing, especially when we consider the important principles to which Meyer has called attention and to which we shall presently turn.

A word should be said about the methods by which the demonstrations of these mechanisms are obtained. In many instances the connections between cause and effect are fairly clear and simple in others the association experiment will supply helpful facts or again it is necessary to resort to hypnosis or modifications of hypnosis, or to Freud's psychoanalytic method. The latter has been severely criticized. It is natural enough that one feels a certain uneasiness about a method which may lead one into a realm of uncontrollable explanations, and it is after all not impossible that if one goes through a sufficiently large number of associations one is bound sooner or later to arrive at thoughts which are connected with deep feelings. But it would be very unjust and unwise to reject a method, and conclusions which only in part depend upon it, because the method has to be handled critically.

From a somewhat different side Adolf Meyer has attacked the problem of mental causation, more especially in connection with dementia præcox. He has laid especial stress upon the seriousness of using inadequate means for getting square with difficulties in life

and has insisted upon the fact that, when we are able to obtain an accurate anamnesis of patients suffering from dementia præcox, we find in the 'normal life' an excessive use of reactions which bring a certain danger with them. Some of these reactions have often been referred to in this review, namely, the partial suppression of events, the substitutive activities and the like; in addition should be mentioned brooding, or more serious reactions, such as, empty harping, tantrums, rattled fumbling, or grossly imaginative substitutions, in other words means which do not adequately square up matters, and which do not give a feeling of completion. It is these reactions that such individuals use excessively, at the expense of more hygienic ones to which we have above referred as healthy mind habits. According to Meyer, therefore, the symptoms, in well observed cases, stand out as necessary results of small beginnings. "The general principle is that many individuals cannot afford to count on unlimited elasticity in the habitual use of certain habits of adjustment; that instincts will be undermined by persistent misapplication, and the delicate balance of mental adjustment and of its material substratum must largely depend on a maintenance of sound instinct and reaction-type." "Mind like every other function, can demoralize and undermine itself and its organ and the entire biological economy." It need hardly be said that these principles upon which Meyer insists are of the utmost importance, not only in dementia præcox, but in other conditions as well, such as paranoic states, psychasthenic conditions, depressions, etc. The difficult problem of disposition which, of course, constantly asserts itself in the study of all these diseases, which Freud attempts to solve for hysteria in his 'Sexualtheorie' and which Bleuler discusses to a certain extent, in his lucid manner, receives the most important help from these principles put forth by Meyer.

If in all that has been said the purely mental factors have been pushed to the foreground, it is of course not implied that physical influences may not enter in varied proportions into the causal constellation as well. There is no hard and fast line on the one side of which physical, on the other mental causes are at work, but there are evidently diseases, or cases, in which the constellation of causes is dominated chiefly by the one or the other. But all factors have to be taken into consideration and it is the task of the future to show what decides the symptom picture, the course and outcome, in so far as the mind habits, the forms of reactions, and the physical factors are concerned.

There is much in this recent development that is still under dis-

cussion, but the essential feature seems to me to lie in the strong evidence that there are certain diseases in which conflicts, and the reactions of the personality to these, stand in the foreground of the clinical picture and that in those the anatomical or chemical changes, or indications of them, have thus far not furnished much help for the understanding of the disease, whereas in other diseases the conditions are reversed. We might perhaps say that, in the former, mental undercurrents break through to the surface, whereas in the latter they may be merely uncovered by general disorders. The opposition seems to me to be due chiefly to the fact that the essentials of the trend are not clearly recognized and that details are discussed instead of the broad principle.

A greater accuracy in, and a better appreciation of the importance of, the study of mental causes and of the personality and its reactions opens up a new field in psychiatry in which undoubtedly the questions of prophylaxis and treatment will have an important share.

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Misconceptions at the Bottom of 'Hopelessness of all Psychology.'

By ADOLF MEYER, Ward's Island, N. Y.

The last publication of Möbius¹ gives in his usual very clear and smoothly readable style an excellent sketch of that dogmatic dualistic schism between psychology and natural science which is the bulwark of those who have to make a fundamental contrast between biology as physiology or physico-chemical investigation of living organisms, and a psychology serving as the grammar of the *Geisteswissenschaften*. "As far as man can be perceived, he belongs to nature; as he thinks and feels he is something different from nature." Since science has only a physical basis, it cannot be applied to mental life. Such a statement would almost sound archaic if we were not aware of the fact that after all it voices the opinion of many of the foremost — not to say the best — thinkers of the day.

Möbius shows up mercilessly the barrenness of our formal psychology and the bulk of laboratory work, and sees in 'metaphysics' the only salvation, the only spice, that will make psychology acceptable. He gives an interesting critical review of the methods of animal psychology, the psychological rationalism, evolution, the difference of man and animal, the instinctive processes, the sizing up of the sum of instincts (= the character), and the competition of the instinctive processes, perception, voluntary life, thinking, feeling, discrimination, memory, conception, the notion of the unconscious, and importance of unconscious processes — pages of most suggestive and entertaining contemplations; and finally, after having shaken one sham support of traditional psychology after another, and after having given the reader a better taste of the meat of psychology than I have ever seen offered in so small a scope, he leads him into — idealistic monism. The 69 pages are full of valuable material and in many ways an admirable summary of some of the most vital topics of a psychology and really the testament of a serious worker and thinker. There is but one disappointment, viz., that Möbius did not apply his keen critical maxims to his own way of getting square with his conception of science and with what he calls the 'hopelessness of all psychology.'

Möbius gives excellent advice. "The chief duty of a psychologist seems to me to be that he use the simplest language, avoid traditional

¹ *Die Hoffnungslosigkeit aller Psychologie*. P. J. Möbius, Halle, C. Marhold, 1907.

formal terminology like poison and distinguish plainly between what is experienced and what is mere inference" (p. 14). Why not apply this same maxim to the inferences as well? Why not say: "The first rule should be to use the plain man's good sense and to go at things for what they are worth, with as little preconceived notion as possible?" Möbius like so many others starts out with assumptions concerning nature and mind which we do not need, which merely embarrass, and at once give one cold shivers; which remain to be proven, unless we already become convinced on the way of their uselessness and futility. He is not satisfied with a biological view-point, and swells the problem of the essence of mind to a complexity out of touch with all experience and therefore wishes it kept out in a special sphere. We need not wonder at his final resignation with the *saltum mortale* into panpsychism: the invention of souls for every cell, for every atom, in order to make intelligible the existence of — what he claims to *know* as a soul in himself and *in himself exclusively!* Such psychology is hopeless and, fortunately for us, can be spared readily. It cannot be a topic of science in the sense of systematized experience.

With many physicians I have long revolted against many of the assumptions which seemed to be forced upon one in studying mental life. Many of these are the same as those which Möbius discusses. But my result has been different from his.

The psychopathologist is very directly confronted with mental activities, since their miscarriage is often enough the center of the disorder for which the patient seeks his help. Certain unusual mental events appear and others fail to take place, and the result is an inability to meet the demands which would be met by normal mental reaction. Like all other *biological* provisions or developments, the mental mechanisms meet, or fail to meet, definite kinds of biological demands and the legitimate question is: what is the type of demands and what is the mechanism or type of reaction that meets it? Further, since there are evidently degrees of efficiency in this function as in all others, we legitimately ask: which are the conditions for the proper working of this function and what are the ways of influencing it if it threatens to miscarry?

In our daily life we use this attitude as a matter of course; and as soon as we enter psychology, whose business it should be to deal with these questions, and to guide us, should we surrender it? As soon as we do, psychology becomes powerless, merely because it pays more attention to extraneous contemplation than to its direct issues.

The effect of this is disconcerting to physicians and to others who should have some training in the accurate, and above all things, purposeful, use of psychology. Instinct usually shrinks from panpsychism as a working hypothesis. The result is that with all the advances in laboratory psychology it is still impossible to convince physicians of the necessity of introducing psychology into a medical curriculum. They are confused and bewildered by the authority of those who want to make psychology hopeless and prejudice its rôle by claiming that psychology occupies itself merely with the abstract 'subjective' something which cannot be called activity or function or anything belonging to the domain of biology, and that it is a sphinx in matters of practical issues; they find singled out a certain aspect of the possible problems and are asked to turn over the rest to physiology, without being allowed to realize that to do this demand justice, physiology must extend into—psychology at its best, not merely laboratory-psychology, but an extension and deepening of the way in which we use our *own* mental activity *and* that of others in practical life.

As soon as the physician sees a mental condition pass from the normal and justified reaction into one demanding his attention, he is apt to surrender his common-sense attitude, considers it unscientific to view the abnormal mental trend as a genuine but faulty attempt to meet situations, an attempt worthy of being analyzed as we would analyze the blundering of a distracted pupil, or the panic of a frightened person, or the bungling of one who reacts poorly in trying to meet an unusual situation. Instead of analyzing the facts in an unbiased way and using the great extension of our experience with mental efforts to get square with things and with one's self in states of dream or under dominant preoccupations, in states akin to hypnotic dissociations or a faulty development of interests and inadequacy of habits, they pass at once to a one-sided consideration of the extra-psychological components of the situation, abandon the ground of controllable observation, translate what they see into a jargon of wholly uncontrollable brain-mythology, and all that with the conviction that this is the only admissible and scientific way. If there were more of the unprejudiced attitude as that shown in the course of psychology outlined by Professor Sanford, more training to *observe ordinary events* correctly, and a demonstration that observation must be accurate according to demands, and that accuracy is not primarily a question of instruments, physicians might feel less hopeless, and less inclined to use that delightfully impersonal and non-committal

emphasis of the physical disorders and of heredity, where a sizing up of the whole situation (for instance, the problem of the whole family), the mental working of the patient and his way of meeting the situation *as well as* the regulation of his physiological mechanisms, should receive an unbiased and unexpurgated consideration.

To divest psychology of its dynamic interest is making it hopeless. Facts such as those reviewed by Dr. Hoch will do most to convince. There are, however, some obstacles which are suggested by the attitude of Möbius, discussion of which may break down some ruts of thought which often prove fatal at the outset of a discussion of even the plainest facts, and for which there are helps worthy of a brief formulation.

The prime difficulty is a fundamental dogma concerning science which leads Möbius at once to divide man into what belongs to nature and that which transgresses it. Such a division brings serious embarrassments and is contrary to the trend which sees the domain of *science* in the task of *unbiased systematization of experience*.

According to Möbius natural science conceives everything from a physical view-point and it knows only of physical explanations. "Physics may give up the attempt at explanation, but it cannot replace a physical by a psychological explanation." On this ground he even wants physiology to eliminate the concept of activity. He accepts such a definition of reflex as 'all reactions or answers of a living being to a stimulus,' but then at once proceeds to expurgate these reactions of an essential part, the 'inner experience' which 'does not really concern natural science.' "All that which goes beyond experience is metaphysics, and this holds for all psychology as soon as it claims general validity, and especially for animal psychology."

This assumes an absolute division of experience into physical and mental, such as seemed justified as long as biology formed a sort of uncertain go-between or 'cela va sans dire,' and as long as one was not willing to give the benefit of doubt of possible artificiality to some of the embarrassing constructions and cul de sacs to be discussed point for point.

1. From the practical view-point we must eliminate as fruitless the term metaphysics as an obviously arbitrary weapon of argument.

2. We must surrender sham *unity* in science and replace it by pluralistic *consistency*.

3. This consistency can be attained in a nondogmatic *hierarchy of systematizations* which allows us to maintain a sincere respect for the world unsystematic as it may appear, and for the order of the things

and events as they actually occur. The world is too pluralistic to be grasped by but one simple formula without doing serious harm to our capacity of scent for error and our appreciation of the actual combination of the things in the real experience which science must not try to ignore, but in which it singles out *principles of regularity*.

4. The fundamental change in the modern attitude is the elimination of unprofitable pondering about the final and absolute nature of 'things' and the turning to *inquiry into events* and their actuality. The theory of atoms is to us the theory of actual and possible relations of qualitatively different materials, and not a means of an unnecessary revisualization in a garb of exclusively quantitative features. The theory of molecules and the various forms of physics, the theory of organization and of inner activities or adjustments (of physiology) of the biological objects of experience, are all dealt with with less imaginative substitutions for what we at last enjoy again to see and accept in exactly the form which they have in our experience.

Our concern is with the events or 'doings,' not with the being or final essence, and therein lies the great difference between the old frame of thought and the modern one. We study the relation of occurrences and experiences and among them we find, on exactly the same ground as the rest of experiences, the occurrence of events and activities which we call mental and which we specify on account of certain specific features of working and the specific rôle in the economy of the individual and the world generally.

The fundamental principle of the non-dogmatic attitude is the adherence to a series of non-prejudicial queries which hold for all events worthy of inquiry:

1. What is the fact in question? (With this query we do not wish to penetrate into the absolute essence of things, such as is the child's desire and that of the philosophy of the past—but the answer is sufficient if it gives us such a characterization as will distinguish the object of inquiry from similar possible topics.)

2. What does the event or fact lead to, or how does it react to tests?

3. What are the conditions for its existence or course?

4. How can it be influenced, and what is our attitude to the event?

These queries cover all the issues of practical life and of science, whether we deal with a problem of physics or chemistry, or the simplest or most complex problem of biology or psychology, or sociology. The result is 'science,' if it is consistent with the systematized experience of physics, chemistry and biology, and especially if

it is consistent with the syllogism of the modern mind: the laws of experimental test. In this *physics* is most fundamental, but not all-embracing. It deals excellently with a certain range or aspect of facts and has within itself a certain hierarchy of 'physical sciences.' Its laws are further in harmony with those of *chemistry*, but they do not *express* all the facts of chemistry, inasmuch as they eliminate the factor of *kind* of substance, so essential to chemistry. Physics and chemistry furnish a scientific basis of *biology*, but at their present stage they do not exhaust the problems of organization, and the adaptation of the organization in strata of biological function of widely different complexity; and finally the strata of *ultra-biological relations* such as are thought of in the terms of soul and God, in logic, etc. We need not wonder that the relations of the mental domain were long singled out and presented in a terminology of their own. Working hypotheses had to be made long *before adequate facts were available*. We need not be surprised either over the difficulty of harmonizing all the old and new data into one whole and the transformation of the various schemes of simplification: the dualism, and the trinitarianism of many physicians who think of body and mind as subserving the higher ultra-phenomenal part, the soul; and the gradual evolution of the thought that the body is deciduous as compared to the soul, to a growing realization that the same holds for mind, and that mind as we know it should not be identified with the essence of soul, since it is changeable with the body, nor with the essence of things as in panpsychism.

5. The next problem is the *relation between mental events and the other biological types of function, i. e.*, circulation, respiration, metabolism, digestion and elimination, regeneration and the neuro-muscular regulations.

The range of mental functions is approached in complexity only by that of the chemical metabolism, but for the sake of simplicity we take as a paradigm of comparison the function of respiration. The essence of respiration as far as we know to-day is the unitary *principle* of aeration of the blood. Nobody would, however, think to eliminate from the practical study of respiration the consideration of architecture of the lung and respiratory tract and of the neuro-muscular mechanisms on which the function rests. Among the *mental* functions we find a wide range of types, determined by the extent of participation of various parts of the organism, as in sensation, in activity, or in the more intrinsically cerebral and 'subjective' processes. The complex coördination of the mental reaction types at any giving mo-

ment is one of the striking features which has led to the concept of the stream of consciousness with which, for all practical purposes, we would, as in the process of respiration, include the whole range of pertinent collaboration of the sense-organs, nervous system, skeletal and vascular muscles, glandular activity, etc. It is a *specific mode of collaboration*, the final essence of which is as yet as unknown as the essence of all things, but concerning the working of which, and the conditions for its work, and the effects, we have a fair stock of working knowledge, which we use adequately in everyday life, and increasingly so under unusual or 'abnormal' conditions without changing our attitude, or attempting to establish a parallelism of a physical and a mental 'side.'

6. At this point the plain man is easily disconcerted by a number of products of insufficiently checked reasoning, either residuals of pre-biological, or legitimate topics of ultra-biological considerations. The first is the question of the essence of mind. Instead of a functional qualification distinctions have been made by emphasis of what is called the *subjective nature of mental activities*. In logic we have a right to make an absolute contrast between subject and object. In the interpretation of events we can, however, only give a relative application of the logical principle according to the extent to which the subjective or objective aspects balance one another. If Möbius tries to remove from biology generally the principle of activity he deprives us of a very useful conception, merely for fear that it might be taken not in the sense of the logic of facts, but in an absolute sense which only holds within abstract logic. The concept of activity is one of the most useful and harmless formulas of expression of events, emphasizing the importance of the rôle played by the 'subject.' Where this rôle is slight we usually speak merely of objects. Where it is more important, the 'subject' is singled out for the rôle it plays in the event and in the grammatical construction. The central position of the mental functions within an individual is apt to give a special prominence especially to the volitional processes; and since in pre-biological days the contrast of volitional elements and physical 'execution' was unhesitatingly taken as one of causative principle and effect, and mind was made the prototype of subjectivity, the connotation of an absolutely subjective agency became a natural corollary. To this is added the fact that among mental activities some can become the knowers of others which approaches the simplicity of the absolute subject and object of logic. In this respect we keep clear of misunderstandings if we stand by the above definition of 'activity,' that it expresses the preponderant rôle of the subject in any event. A stone

plays its rôle in the stream of the world according to its qualities and make-up, essentially as an object and according to its capacity of *resistance*. It resists, falls, hits, and 'acts' for what it is worth. The seed of a plant plays its rôle with a greater range of possibilities depending on its organization. It is to a less extent a mere object of the forces of the surrounding world. In the animal series the inner working of the individual reaches an increasing development to which we give expression in the term of function in the sense of activity. Among these functions the mental activities have the leadership of conduct and on account of the importance in the religious and ethical evolution, this kind of inner working became characterized as 'absolutely subjective,' as we have seen, with only relative justification. Since the logic of facts knows of no absolute activity there is no need of being disturbed by the term.

Another spectre or product of unchecked logical consistency is that of solipsism: 'You can only know and feel yourself.' 'The mind is beyond human ken,' etc. The whole conception is one of those conclusions which are very perplexing but which at once lose their alarming trait if we consider practically the extent to which we can act on the knowledge of the mental states of others and all that without an attempt to translate the facts into a terminology different from that used in mental reactions generally, including our own. We know mental events best in terms of mental events, and use them in our experience according to the effects they produce. That presupposes of course that we do not make artificial and unessential subdivisions, between a subjective something and its physical manifestations.

Hand in hand with this goes the puzzling thought: how can mind be evolved from matter? The puerility of this question is obvious. We admit that we do *not* know *why* certain combinations of molecules of definite kind form a constellation which implies with necessity the phenomena of electricity. It is a fact which we accept as a fact of experience. Those who are trained to make the dualistic division between mental experiences or occurrences, and physical ones, merely *assume* that they can understand *why* such constellations of certain metallic stuffs as the above mentioned, go with the phenomena of magnetism, others with the phenomena of electricity, etc.; and they refuse to see that the biological events of the order of mentation are no doubt in a similar way dependent on sufficient organization and constellation of an organism and that the coexistence of these constellations with their manifestations is a fact which we have to accept as merely *one instance* of the general problem of qualitative differentiation of the universe. The question why

is mind mind, and just what it is, can be as little answered as what gold is, and why it is and why it should be so. Consequently, the impossibility of getting an answer to the puzzle — what makes mind mind, and what the relation is between the underlying physical constellations and the 'result' is only part of the problem of why the world is organized as it is. Our inability to answer that does not imply that we are any worse off in regard to mind than with other facts of quality that we accept without puzzle, satisfied if we can determine the *conditions* of their occurrence; and it does not follow that for this reason, mind must be something quite different from the rest of experience, provided that we realize that it presupposes sufficient organization and opportunities of work.

There is of course a certain justified longing for a working hypothesis concerning the rôle and position of mental activities, since without one few people can keep from drifting into misleading ruts of thought. A working hypothesis can, of course, not be expected to be more than an abbreviation of the available facts in simple terms. Any such abbreviation of the things as they are, especially in a complex field, will therefore try to say very simply what we know needs more amplification, and we inevitably must use terms which cover but relatively the general principle, especially if we are with necessity limited to expressing the whole *range* of mental functions with *one* mental reaction or thought or expression.

The question has so far come up chiefly in connection with the problem of animal psychology. Is there now, or will there ever be, any advantage in distinguishing mental and non-mental biological reactions? As soon as constellations arise such as we cannot express fully in any other but mental terms with our present knowledge, in other words, wherever we see steps of 'mental causation,' in the sense of assertion of biological energy with a conscious link, we have evidence of a special reaction-type. The easiest criterion of mental reaction is what we have in ourselves. We merely ask: has anyone ever experienced a given event as a mental one, and can it not also be conceived without the principles of mental activity?

The question of such criteria is a very young one. Loeb has used that of associative memory. He would take a certain activity or function to imply a mental character or to work with mental principles, if it implied evidence of *associative memory*. For a number of years I have used as a formula, under the heading of biological adjustments and elaborations, the concept of 'symbolization.' Mental reactions constitute a type of biological reactions which act as part of a *system of symbolization*, working through their *meaning* as well as

through the *direct* change they involve, a conjoint elaboration of needs of intercommunication between individuals, and, within the same individual, a complex interaction of various simultaneously occurring components, and the possibility of using the same symbols or reactions in the elaborations of constructive imagination, in the chronological memory-scheme, in the utilization of what is beyond immediate experience, etc. Through the unequaled role played by quality, as opposed to mere quantitative propositions, it is a marvelous saver of energy and the field of highest evolution. The reactions are essentially of one kind, as far as they make up consciousness or are parts of it; but, according to the special laws of their occurrence, they appear as 'sensations,' or 'ideas,' or 'memories,' etc., as adaptive reactions to situations, as 'volitions'; as dreams and wake-states; as part of direct effective activity or of thought. The theories concerning their organic foundation or the histological conditions for their occurrence are wholly inadequate; but we have no reason to think that the reaction, if it does occur, occurs otherwise than fulfilled, and that a division into a physiological part and a mental concomitant would be a complication which should not be accepted without better proof than can be given to-day.

It may be that the term symbol suggests too strongly the addition of a 'meaning.' The main point of the hypothesis is that it does away with parallelism, and forms a contrast between mental and non-mental biological functions without ripping apart the principle and the somatic reaction. The stream of mentation and the entire somatic activity as far as the stream of mentation forms its essential link, form the mental activity of the moment, and the only difference between the two extremes is the extent of collaboration of extra-cerebral mechanisms.

Such a hypothesis is perhaps unessential if we adhere to the principle that for the study of psychology, we must adhere to the events as they occur; we study these for what they do, for the conditions under which they arise and for the ways in which we can modify them.

The writings of Professor James, Professor Woodbridge and Professor Stratton and others mark a striking change in the consideration of the problem of conscious life. I should hardly have brought forth the above views but for the hope that some further helps may be elicited by them, in the adjustment of a great difficulty, the attitude of hopelessness about psychology and the even greater calamity of indifference and inaccessibility produced by dogmatic notions about science in physicians and others who should help us in building further in the evolution of practical experience.

PSYCHOLOGICAL LITERATURE.

APHASIA.

Revision de la Question de l'aphasie. La troisième circonvolution frontale gauche ne joue aucun rôle spécial dans la fonction du langage. PIERRE MARIE. Semaine Médicale, May 23, 1906.

Revision de la Question de l'aphasie. Que faut-il penser des aphasies sous-corticales (Aphasies pures)? PIERRE MARIE. Semaine Médicale, October 17, 1906.

Revision de la Question de l'aphasie. L'aphasie de 1861 à 1866. Essai de critique historique sur la genèse de la doctrine de Broca. PIERRE MARIE. Semaine Médicale, November 28, 1906.

Un Nouveau cas d'aphasie de Broca dans lequel la troisième circonvolution frontale gauche n'est pas atteinte, tandis que le ramollissement occupe la zone de Wernicke et les circonvolutions motrices. PIERRE MARIE and FRANÇOIS MOUTIER. Bulletins et Memoires de la Société médicale des Hôpitaux de Paris, February 13, 1907.

*Sur un cas de ramollissement du pied de la 3e circonvolution frontale gauche chez un droitier, sans aphasie de Broca.*¹ PIERRE MARIE and FRANÇOIS MOUTIER. Bull. et Mém. de la Soc. méd. des Hôp. de Paris. November, 1906.

A propos d'un cas d'aphasie de Wernicke considéré par erreur comme un cas de démence sénile. PIERRE MARIE. Bull. et Mém. de la Soc. méd. des Hôp. de Paris. February 1, 1907.

Sur la fonction du langage. Rectifications à propos de l'article de M. Grasset. PIERRE MARIE. Revue de Philosophie, 1907.

Since the publication of the review of the last contribution of Wernicke to our knowledge of aphasia (PSYCHOLOGICAL BULLETIN, July, 1905), a series of most interesting articles has appeared from the pen of Pierre Marie. They are entitled: 'Revision of the aphasia question,' and whatever the final result will be, they are not only a court of inquisition and a serious arraignment of medical logic and critical capacity, but a spirited call to a less dogmatic manner of dealing with the facts. A few years ago Nissl came out with a merciless exposure of the ease with which neurologists had handled their facts under the inspiration of the fascinating neurone theory.

¹ But with logorrhea and lesion of the foot of T_1 .

As I showed in my review of his book (PSYCH. BULLETIN, I., 1904, p. 259) Nissl himself had built something like a glass house with his own theories, and while neither his critical analysis of the situation nor his positive claims should be surrendered to oblivion, his lesson will be chiefly a vigorous appeal for more scrupulous critique. Marie's 'revision' is based much less on constructive contentions such as Nissl's 'gray' or his independent fibers; but it also uses many new conceptions which have not failed to attract criticism, in which, however, more than one of his adversaries has been found napping.

Marie's views are based on over 100 cases of aphasia of which over 50 are with autopsies. In his marvelous service at Bicêtre he has over 30 cases of aphasia at a time. He early found a remarkable difference between his observations and the book descriptions, and before long he met with cases of 'motor aphasia,' without lesion of the Broca convolution, and cases with lesion of the Broca convolution without aphasia. Moreover, where the third, frontal was affected, he always found this lesion 'complicated' with other lesions, especially in the 'Wernicke zone,' and he came to the final conclusion that these 'complications' were the real lesion, and the Broca lesion an irrelevant coincidence.

The classical writers assume an auditory centre in which the images of words and tunes are deposited (in the posterior part of the first temporal gyrus), a center for visual word images (in the angular gyrus); and further a center for the motor images in the third frontal gyrus and a graphic center in the second frontal gyrus.

Marie denies outright the existence of an auditory word center in either the foot or the middle part of the first temporal; indeed, he considers the evidence for even a common auditory center in these parts as an unfounded product of anatomical notions. He also denies a visual center for words, a writing center and a motor word center. What has been interpreted as cortical and subcortical, complete and pure motor aphasia, agraphia and the various forms of word blindness and word deafness is all to be explained without the assumption of such special centers. *Pure word-deafness* (inability to understand words, with integrity of hearing and of spontaneous speech and integrity of reading and writing and of the intellect) he calls a myth. He says the few reported are all cases of certain forms of labyrinthic or other deafness, *i. e.*, of peripheral origin and not as Liepmann thinks due to a subcortical lesion in the temporal lobe. He even considers a general auditory center clinically unproved. What does occur, are cases with *difficulty of understanding of spoken words* due to a

lesion in the left hemisphere; but then it is a lesion of the 'zone of Wernicke' which includes the cortex and underlying marrow of the supramarginal and angular gyrus and the posterior part of T_1 and T_2 — *i. e.*, a very roughly outlined portion of the hemisphere taken without any subdivision of the cortex or the fiber-paths, a product of the simplest anatomico-clinical analysis of autopsy material and free not only of speculation, but also of attempts of correlation with more or less established subdivisions of anatomical value. A lesion of these regions produces the syndrome of the true Wernicke aphasia, *i. e.*, jargon aphasia, more or less abolition of reading and writing and difficulty of understanding of spoken words. This difficulty or *intrinsic aphasia* is not due to a disorder of 'sensory word images.' The word-deafness is but rarely complete. Single words, short sentences and simple orders are usually understood (and by no means always only the same words from day to day); but anything complex leads to a very plain difficulty which, however, is not simply psychosensory, but denotes *an intellectual loss* different from other defects of intellectual efficiency by involving especially 'the stock of knowledge acquired by didactic procedures.' It is to the lesion of the zone of Wernicke that Marie ascribes this *defect of comprehension and of intellectual elaboration* which is said to constitute the *intrinsic aphasia*. The speech disorder is part of this *difficulty of elaboration, not a disorder of sensory reception*. This is a fundamental point, to be discussed further.

Marie similarly repudiates the sensory character of *word-blindness*. He has never seen a simple cortical lesion of the angular gyrus alone with suppression of reading. There are, to be sure, cases with derangement *chiefly* of reading; but Marie denies their being due to lesion of the angular gyrus, and insists on the fact that in these cases a lesion exists, not in the area of the Sylvian artery, but of the posterior cerebral artery supplying the mesio-ventral surface of the occipital lobe, but frequently extending slightly into the marrow or white substance of the Wernicke zone, *i. e.*, the lateral wall of the parieto-occipital lobe. This well known fact explains according to Marie how many of these cases may have not merely hemianopsia, but also some vague speech disorders in addition to their 'pure' word-blindness. But this is merely an anatomical issue and does not explain why the pure alexia when it does occur, should be considered merely as a 'defect of intelligence,' especially if the cases have otherwise little defect. What Dejerine tried to explain is the pure alexia (*i. e.*, simple inability to read, without inability to write) in the simple lesions of

the posterior cerebral artery and the progression of the case to an alexia with *agraphia* through addition of a lesion of the angular region. Marie leaves untouched the issue whether this additional agraphia through encroachment on his 'Wernicke zone' is to be explained as a mere effect of a diffuse intellectual disorder, or might after all point to a reading-writing mechanism. He introduces the term '*extrinsic aphasia*' to designate such a disorder as 'pure alexia,' and makes a strong point of the fact that it is 'rarely' pure, but usually part of a diffuse speech disorder.

The most telling onslaught refers to the so-called *Broca convolution*. In the very fascinating article on the history of the Broca convolution (*Semaine Médicale*, November 28, 1906), Marie furnishes us pictures of the brains of the original cases of Broca which are still to be seen in the Musée Dupuytren, without ever having been sectioned. In the famous case Leborgue, reduced to the recurrent utterance of a few syllables, the lesion of F_3 is merely the anterior part of a large focus which also destroys the central convolution and T_1 , and part of the supramarginal gyrus. Under the influence of the discussion of the day which are sketched in a masterly picture and read like a novel, Broca paid attention only to the apparently deepest lesion in the 'anterior lobe.' His second case was probably merely one of senile dementia and senile atrophy, without any evidence of a hemorrhage or lesion (merely a depression with an arachnoid cyst). The subsequent casuistics brought many interesting contradictions, but somehow the dogma of a Broca convolution became established, as one of those evolutions of gregarious thought in a field where one individual has usually too little personal experience to feel the weight of all the pros and cons. Marie has collected a fair number of cases with 'Broca aphasia' without lesion of $L.F_3$, and cases of lesion of F_3 without speech disorder. F_3 is affected in about 50 per cent. of the cases of motor aphasia and that merely because the artery to F_3 is so often involved incidentally. If there is only occlusion of the artery to F_3 there is no aphasia; but usually the posterior branches are involved as well and produce the lesions which are necessary for inability of utterance and also for the involvement of the intrinsic functions of language. The arterial branch to the Broca convolution comes frequently not directly from the Sylvian artery but from the branch which also supplies the lower part of the central convolutions and with it the 'lenticular zone,' and not infrequently the subcortical substance under the anterior part of the Wernicke zone. Hence the great variation in the degree of general involvement.

It is odd that such a dogma as that of the Broca center should have survived with so little conclusive evidence. Was it the surgical experience especially with tumors which has made some inferences from the dogma appear useful when really the facts should be explained on a different basis? Or is it the hesitancy about publishing negative cases? or our tendency to adhere to didactically clear and easy points?

Since the studies of Dejerine, *motor aphasia* (see PSYCHOLOGICAL BULLETIN, II., p. 265) has been recognized to consist of difficulty or inability of initiation, but *also* some difficulty of understanding of spoken and written words and disturbance of the internal language. Marie considers this disorder of the internal language as the essential part of intrinsic *aphasia* and the motor disorder he calls *anarthria*, not to be confused with the *anarthrias* or *dysarthrias* of the cases of *lacunæ* or small foci of softening in the central ganglia or in palsy from lesion of the bulb, peripheral nerves or muscles of the larynx or mouth. It is produced by a lesion of what Marie calls 'zone lenticulaire' which, like the 'zone de Wernicke,' must be taken without regard for subdivisions. It comprehends (*Revue de Philosophie*, 1907) the caudate and lenticular nuclei and the external and internal capsules between two transverse planes marked exactly by the anterior and posterior ends of the island; while in a footnote of the article of October 17, 1906, the 'zone lenticulaire' is defined as consisting of the white matter between the insular gyri and the lenticular nucleus and the outer layers of the latter (and, in the case published with Moutier, the anterior two gyri of the island with the underlying external capsule were destroyed, without *anarthria*). A lesion in front of this zone produces neither *aphasia* nor *anarthria*; and to produce "aphasia," a lesion must extend back of this zone into the zone of Wernicke, most frequently in the white matter under the supra-marginal gyrus. Marie arrives at the remarkably simple formula: *Broca aphasia* = *Wernicke aphasia* + *anarthria*.

Pure motor *aphasia* (without interference of internal language) becomes a simple *anarthria*, a term which from now on will have to be taken in this specific sense while *dysarthria* may remain as the expression of not specially linguistic, but general disorders of the movements of the speech organs, impediments of execution of well-planned efforts. *Anarthria*, like *alexia*, is not *aphasia*, but an *extrinsic disorder*, and it need not involve actual paralysis or motor disorder of the speech mechanism, but can occur independent of it, just as in many old persons a lacunar state of the brain can produce an inability to walk, without any real paralysis or contracture. Hence

'aphasia' and 'inability to speak without paralysis of the motor mechanisms' are by no means synonymous; and to explain the latter, Marie does indeed attribute a great importance to the lenticulo-striate body and its connections. Some of its lesions produce anarthria (*i. e.*, they involve what used to figure as the function of the Broca convolution), others ('especially the lacunar ones') pseudo-bulbar palsies, *i. e.*, essentially difficulty of execution of speech-movements with actual evidence of palsy of the mechanisms of enunciation.

Marie claims to stand on a ground free of hypotheses. He adheres strictly to the simplest clinical conceptions and the simplest most unsophisticated anatomical facts.

His conclusions may be summed up as follows: Aphasia is delivered of the cruder forms of the over-specialized concepts of word-notion and word-image. Language is essentially a unitary function, in some way depending on the integrity of the Wernicke zone. Its disorders are intellectual and not sensory. Besides these intrinsic disorders or aphasia there occur also extrinsic disorders, such as alexia in connection with lesions of the posterior cerebral artery, with varying involvement of the Wernicke zone, and therefore varying degrees of complication with 'aphasia'; and anarthria, referable to lesion of the lenticular zone and not to the Broca convolution, but also frequently encroaching upon the intrinsic language function, owing to spurs of softening into the white matter of the Wernicke zone.

As far as the distinction of intrinsic and extrinsic aphasia goes, Marie's expression is a decided simplification. Since the interesting study of Freud, there has been a strong tendency to speak of a 'speech-field' as a unit and to think of marginal regions as being involved in the 'pure motor' speech-disorders and the 'pure receptor' speech-disorders. Marie has limited the essential speech-field to the posterior part of Freud's speech-field and stands for a simple unanalyzed empirical cortical field with the underlying white substance. His claims that wherever intrinsic disorders of language existed, he found this zone involved, must be accepted until cases to the contrary can be brought forward. For this the methods of most investigators have been too superficial. Nothing short of serial sections of the entire brain will make a case convincing, and so far I cannot show a case in my extensive collection which could be offered as a convincing refutation of Marie's anatomical views, a result which may be due to the fact that all of my cases came from observations with distinct mental disorders, and specially diffuse lesions.

It is worthy of note that in 1881 Wernicke in his volume III., pp.

173, 176 and 179, concluded that the fibers from the third frontal gyrus to the bulbar nuclei must pass through the region of, or above the external capsule inward from the posterior end of the operculum since lesion of it entails 'motor aphasia.' He later adjusted this interpretation by assuming that these cases must have been cases of 'transcortical motor-sensory aphasia.' We must leave open the discussion of anarthria and its forms, especially since agraphia has not been considered specifically as yet in the light of Marie's conceptions.

The matter of greatest interest to the psychologist and to the clinician is the attitude of Marie concerning the *identification of aphasia and intellectual defect*. Dejerine says in one place that every aphasic has a defect of intelligence, and in another, that aphasia presupposed integrity of intelligence. It is evidently necessary to distinguish degrees and kinds of intellectual defect and it is questionable whether the expression is not altogether too vague. In this respect Marie superficially compares the intellectual defect of the aphasic with that of the victim of an early acquired infantile brain lesion, devoid of dementia in the ordinary sense but with simple diffuse reduction or restriction of educational capacity; and he contrasts this condition with that of a 'dement' and of a general paralytic. To consider the kind of reduction in the aphasic sufficiently characterized by calling it one of 'the stock acquired by didactic procedures' is very doubtful. To illustrate this defect Marie gives a very graphic account of an old moderately aphasic cook who showed no defect in his general demeanor, but blundered badly in frying an egg, and yet was quite pleased with his result. Are we not justified to ask: what is the relation of this slip to the aphasia? It would evidently look like a *petitio principii* to claim that the speech defect as such should be considered *the* intellectual defect in this generally reduced patient. Defects of speech resembling aphasia may be part of a dementia or of a general paralysis; in that case we have merely a symptomatic aphasia scarcely worth that name, with probable integrity of the speech mechanism, a deficient *use* of the tool; and in turn disorder of language will naturally interfere with those intellectual functions which usually or necessarily involve 'internal language,' without our having a right to incriminate the intellectual capacity generally. Moreover a lesion producing the speech-disorders may involve other functions apart from those of the language-thought function.

Intentionally or unintentionally, Marie does not draw into the discussion the recent studies on apraxia and asymbolia reported in previous reviews of the BULLETIN (II., pp. 278-282). It was and is

my conviction that the salvation of the complexity of the aphasia problem would come with a sensible subordination under the broader problem of faulty reactions generally and specifically those involving asymbolia and apraxia (PSYCH. BULL., II., p. 282, the two last paragraphs). Marie's 'stock of the things learned by didactic procedure' comprehends practically everything that may also be involved in the apraxias. Or is it perhaps unwarranted to claim that the apraxias are something worth specifying? And is the 'disorder of language' necessarily responsible in such defects as those of the cook?

On this point heuristic interests force me to respect the observations of Liepmann, Pick and others, and even to look for a direct application of the principles derived by them to the field of aphasia. And even didactically and for practical purposes, the principles are worthy of use in the radical elimination of the errors of the period preceding the Revision and the transvaluation of the facts which may stand the tests.

Marie has, inevitably to my mind, stirred up the conflict with the most serious crux of neurological psychology, viz., the problem of the position of sensation in the scheme of mental activity and therefore the relation of the 'sensory centers' to the 'intellectual processes.' Since Locke and Hartley the ground was prepared for a dissolution of mental processes into elements, and Marie's teacher Charcot strongly upheld the resulting atomism. Marie retracts from this artificial tangle, eliminates the supposed importance of the sensations, and designates his essential findings with the term 'intellectual defect.'

It is obvious that there *are* clean-cut mechanisms on the integrity of which the special types of *sensation* depend, and destruction of which slices from our capacity of mental activity or experience definite qualities or domains. We can reduce the capacity of visual experience by removal of one eye, one optic tract, one external geniculate body, one optic radiation, one calcarine area, or merely its more or less defined connection with the rest of the hemisphere or with the other hemisphere; or we can apply this process of reduction bilaterally and obtain at once absolute blindness, or merely limitations of the fields of vision and finally also an encroachment upon the utilization of previous visual experience, visual 'memory' and visual imagination and its use. Up to a certain point we speak of mechanisms of sensations, viz., as long as we deal with parts which are essential for the concrete object-experience; and the eagerness for psycho-physical correlation has led to the identification of certain parts with the actual sensations. The fibers are, of course, merely conductors, but the

places of synapses are considered as possible centers. The first probable station of 'visual sensations' is the calcarine cortex; beyond that begins the controversy over special memory centers. In all these matters popular and scientific generalization has rushed far beyond what counts as safe ground. The calcarine cortex is a place destruction of which assures hemianopsia; but that does not mean that the calcarine cortex is the 'seat of the sensation,' or at least that it 'sees' any more than the retina sees. All we know is that the person as a whole sees, as part of that unit which we can also designate as the stream of consciousness, and subdivide into functional subunits or mental complexes. The subdivision into complexes according to anatomical centers yields quick results which, however, brings disadvantages to current medical psychology and those who copy from it. It tempts one to accept correlation of atomistic mental elements (the results of logical analysis) with physiological and anatomical fragments. This atomism is contrary to actual clinical and anatomical experience. It populates the brain with fictitious sensations and memories of sensation without regard for the actual functional events.

Marie correctly sees in the intrinsic disorders of language a disorder not of sensation but of comprehension and elaborations. He says in his reply to Grasset: The speech-disorder in lesion of the Wernicke zone is due to a disorder of intellectual elaboration and not, as the authors say, to a disorder of sensory reception. The question then arises: Where does the intellectual elaboration begin and, further, is there any hope of better differentiation of the 'stock of the things acquired by didactic procedure' — a domain which includes so many things outside of what would be involved in speech-disorder. Marie knows of but one intrinsic aphasia, a more or less in quantity, according to the amount of tissue disabled in the Wernicke zone. How are we going to size up the *qualitative* differences between the cases?

Wernicke and others have long used such a distinction as primary and secondary identification of impressions instead of sensation and perception. Instead of this it may even be better to recognize more stages of a hierarchy, such as simple realization, understanding (or realization of wider relations), and utilization. Where does sensation cease and where does intellect begin? A decision would be quite arbitrary. We certainly have altogether too little knowledge of observation to decide it, and it becomes even questionable whether any gain can come from attempting a clean-cut subdivision. We are more and more forced to the conception that the specific nature of sensation is not to

be found in any special mental quality, but in *extrinsic* and nevertheless most essential facts: a sensation differs from other mental processes by the relation to objects, the participation of definite sense-organs, and of parts of the nervous system which could not simultaneously be used by other impressions without altering the adequate accompanying mental reaction. The mental quality of sensation in dreams and hallucinations does not differ fundamentally from 'real sensations' except through the extrinsic situation and the difference in possible connections and elaborations. The 'sensations' of dreams are sensations and 'real' only because the situation does not disturb the trend of mentation sufficiently to precipitate conflicts and the realization of a disharmony. On the other hand, in a waking state the mental adjustment to impressions is so alert and perfect that we at once identify the most essential types of adjustment or *reaction* with the process of *impression*, because that is the thing to be noticed and more likely to become a topic of thought and words because it is common-ground for everybody.

There is no end of extending the sensory character of all mental experience on the part of those who find it convenient to operate with sensations. Emotion becomes visceral sensations, and thinking sensations of an inner sense, until we have successfully reached an exclusive system of associations of sensation and their memories with at least the appearance of a common denominator. A large number of our mental reactions must be pictorial and instantaneous reactions or elaborations or whatever we wish to call the 'adjustment of understanding'; they must be adaptation to rapidly changing outside relations with minimum alteration of ourselves; special circumstances make them 'sensory.' Other reactions are more essential in activities, and were formerly specified as volitional; but here the extrinsic facts are so little obtrusive that there is no regret over the fact that volitions have ceased to be singled out from the other mental activities. The main fact about volition is again the occurrence of the 'mental adjustment' under appropriate *conditions* and with appropriate *results*, and the organic links are so personal and, like the cerebellar function, so much part of the machinery of our own organism, that they do not tend to have specific mental equivalents or to call for their invention as where we call mere impressions 'subconscious sensations'; they are of no importance for interchange of thought and mental realization. Abolition of sensation is evidently extraneous to mental function, unless it is really a disturbance of understanding (*i. e.*, broader realization) or capacity of utilization. Sensation, identification and elaboration after

all are terms covering the entire field from simple realization to utilization and between them there is no sharp line. The whole is finally summed up under the general biological conception of capacity and activity of *adjustment*, and we study in aphasia the inadequacy of those adjustments which involve the activity of the language-mechanisms, and their relation to inadequacy of adjustment in other domains of mental activity, such as that of direct activity not implying speech.

There is, in the tendency of Marie, a certain danger of going from one extreme to the other. The atomistic psychologies have probably erred in putting all the weight even of elaboration on the receiving centers. On the other hand, there is no end to regression to a final abstract and thoroughly expurgated intellectualistic standpoint, if one pushes Marie's simplification of a 'global intellectual function' to an extreme. We have not the slightest idea as yet how the elaboration takes place, to what extent it is made up of global waves spreading from the receiving stations into 'coagitation-fields' of no longer 'sensory' character as Flechsig seems to suggest, or whether more specific reaction paths exist. (Marie has added relatively simple tests of 'coagitation' to the current tests of mental examinations of aphasias in the form of compound orders, such as — "here are three unequal pieces of paper on this table, give me the largest one, tear up the middle one and throw it on the floor, and put the smallest piece in your pocket," or "get up, go and knock three times at the window with the finger, then come back in front of the table and walk around your chair and then sit down.")

We now turn briefly to some valuable studies in the psychology of aphasia, undertaken by Marie with Vaschide.

The first study¹ is made with D'Arsonval's chronoscope and simple reactions and reactions to one of two noises of equal intensity but different quality (table and china). The tests are three seconds apart. The figures are the average of 20 successive reactions. The adequate training is rather difficult and the assertion of understanding of what is wanted very deceptive.

	Simple reactions.		Choice reactions.	
	Rapidity.	Variation of average.	Rapidity.	Variation of average.
Mich.	37.8	4.61	38.2	4.13
Barn.	15.5	1.4	20.6	4.99
Perr.	27.9	5.9	54	10.85
Bloch.	19.2	1.2	84.3	39.1575

¹ 'Recherches expérimentales sur la vie mentale des Aphasiques. La vitesse des temps de réactions auditives chez quelques Aphasiques,' *Rev. Neurologique*, XI., 1903, pp. 228-231.

In Mich., who appears like an average normal person, the internal language is almost intact, also in Bloch, who is distracted and does not see well; in Perr., who appears vivacious, it is reduced to motor images poor in qualitative epithets; in Barn., it is practically abolished, and yet he looks bright and intelligent. The first three cases have long been hemiplegic and reacted with the normal hand.

In the simple reactions, Barn. and Bloch react fairly promptly, with moderate variations, but at least Bloch with some evidence of distraction; the other two are easily side-tracked, slow and with wide variations.

In the choice reactions Mich. reacts correctly and as rapidly as with the simple reactions. Barn. reacts promptly, but only once in ten reactions did he distinguish the correct and the incorrect response, although he distinguishes the noises. He anticipates continually, and the good and bad reactions rate with 20.6 and 21.2 respectively. He belongs to the motor type. Bloch is at least conscious of the difficulty, but develops marked automatism. Perr. (visuo-motor) distinguishes poorly and has a kind of motor abulia.

The slowing is far in excess of any receptive disorder. It involves the elaborations. The automatism shown is strikingly motor, and not a sensory reaction.

The account contains a brief statement of the introspective and motor analysis, but no account of the actual aphasic disorder.

The second study refers to the immediate memory ('Recherches expérimentales sur la Mémoire immédiate des Aphasiques,' *ibid.*, pp. 322-323). The rough memory was tested by series of sounds, numbers, syllables and words (with or without sense, nouns, adverbs, verbs, etc.), read at the rate of one a second and repeated immediately. Eight patients were tested for six weeks and again after a month. One of them was a traumatic aphasia. The defect proved very marked. None remembered more than three and maximum four tests of a series. Verbs were best remembered; next the words of emotional or indefinitely intellectual nature; the others met much more rapidly with exhaustion of attention. The traumatic case was but little reduced, remembered four-five numbers, syllables or sounds — evidence that quite a little of the disorder in the others is from diffuse disturbance?

According to the third communication ('Recherches sur l'association des idées chez les Aphasiques,' *ibid.*, pp. 722-724), the association tests (on nine cases) brought out almost complete absence of response in most cases. The unadorned test-excitation has no dynamogenic

value. Contiguity or similarity have hardly any influence. With effort, a memory or some conclusion may be obtained. Even in one to two minutes the patient repeats the same word distractedly and helplessly. Association of actions was equally poor, and in the small numbers in which they succeeded, an unanalyzed execution of the whole act. The traumatic case again approached the normal condition.

Without a full report of the cases, these results naturally tell little with regard to the issue of relation of intellectual and language defect. It is obvious to any one familiar with the issues of aphasia-examination that much more pointed and discriminative tests are needed beside these general ones, and that the interesting contrasts of specialized defects of language reported in Bastian's collection cannot cease to be suggestive of further subdivision of 'global function.' In such a domain as alexia there remains a need of further explanation of the peculiar series of effects of lesion in the visual zone: simple right hemianopsia without alexia, then with alexia without speech-alteration, then such involvement as will imply agraphia, but so little general speech-defect that one cannot very well speak of a 'global disorder.' How is it that the 'intellectual center' fails to cope with word-vision and writing while it still gets along with word-hearing?

Marie does not altogether escape the tendency to bring in arguments extraneous to the anatomo-clinical field to which he professes to adhere. In the discussion of alexia he draws in the argument that evolutionary grounds justify the expectation of a specialized (strictly one-sided) 'center' of spoken language in the sense of a specialized mechanism of elaboration; reading and writing are, however, too recent an acquisition to figure as an actual center. These evolutionary arguments are, however, rather irrelevant, and as little convincing as they were in 1897 when Marie first published them. It may be plausible to exclude on this ground the word-vision center, but it does not elucidate the intelligence center in the left posterior association center of Flechsig until we shall actually be able to show a difference between the left and the right hemisphere in this region. Since this is not accomplished satisfactorily the whole question of 'centers' had best rest. Dejerine's visual word center in the angular gyrus is not improbable 'owing to simple logic' but owing to lack of evidence, and owing to the inadequacy of all of our present center-notions.

In other ways as well it would be better to pay more attention to some really accessible anatomical controls. The nonacceptation of a general hearing station is not easily understood in the face of very fair facts, and the pertinent controversy (October 17, 1906, p. 493) not

wholly without some haziness. It is difficult to accept Marie's statement, that there is a special tendency to assume a cerebral affection of hearing *especially* if it is associated with disorders of equilibrium. In this case one would more probably look for labyrinthic disorders. Further, while Marie refutes the idea of deposits of word-images, which would have to result in the formation of veritable mushrooms in polyglots, he suggests "*syllabic mechanisms*" in a receiving center. Has he perhaps observed a case of aphasia with isolated loss of definite syllables?

The examination of cases of cerebral lesions demands a systematic plan and it is not easy to see how we can at present improve on the following: We test the capacity of reaction in each of the receptive functions: the extent of crude simple reaction (auditory, visual, tactile, etc.), the extent of graded elaboration from the material of each field into the channels of possible elaboration: spoken and written language, activity in the form of elaboration of orders, and utilization of combination of senses, and for each of these fields it is necessary to test various grades of elaboration. For a clinical and psychological analysis, Liepmann's plan (PSYCHOLOGICAL BULLETIN, II., p. 280) had best be applied to each series.

The *diagnosis* for practical purposes will have to determine the material for reconstructive reëducation (for this there is practically no material with accurate autopsies) and the anatomical diagnosis depends largely on features extraneous to the intrinsic speech-disorder itself—the extent of receptive and of emissive (anarthric) disorders, and their relation to crude receptive and hemiplegic disorders, etc.

An examination of concrete cases weans one of the idea that the foundations of the generalizations about the brain are so safe as dogma will have it. Untiring labor will be required to build further: above all things a sufficient number of cases which are complete in most respects, and less juggling of incompletely correlated half-observations. That cases of operative clearness, such as traumatisms, will ultimately have to decide many issues, becomes fairly plain from Marie's psychological experiments, and these cases are extremely rare and worth the most careful record and communication.

Doctrine de l'Aphasie Conception Nouvelle. Dr. BERNHEIM.
Nancy. Paris, O. Doin, 1907.

Bernheim has also repudiated the existence of a special auditory or visual speech center. There are only centers for the crude sensory impressions. Visual and auditory memory images are like all phe-

nomena of consciousness evoked in *the psychic sphere, the frontal lobe*. There is no representation by individual cells but the same brain cell can serve for various sensory conceptions. A lesion of the first temporal gyrus or of the connections of the visual lobe interrupts the action on the frontal lobe which does not any longer evoke the memory of the word and of associated interpretation. The words which are forgotten vary from day to day. The work of the so-called motor and graphic word centers is done under the direction of the auditory or graphic word-images elaborated in the psychic sphere through fibers of the internal capsule to the bulbar and spinal mechanisms. The aphasia with or without agraphia produced by lesion of the Broca region is not due to destruction of a center but to destruction of the connection between the psychic sphere and the auditory and visual centers and the spinal-bulbar mechanisms. Motor aphasia and agraphia are therefore always 'subcortical' and they occur at times independently because the two have not the same mechanism of formation nor the same path of transmission.

We need hardly point out that B. operates with a number of conceptions which would be difficult to substantiate.

APRAXIA.

Beiträge zur Apraxielehre. F. HARTMANN. Monatsschrift f. Psych. u. Neurolog., Bd. XXI., pp. 97-118, and 248-270.

In connection with the discussion of Marie's center of the 'stock of things acquired by diadactic procedures,' Hartmann's recent study is of interest as an apparent vindication of functions of the frontal lobe. It is reported here especially because of its emphasis on a methodical issue, viz., the study of the 'stream of activity' or *Bewegungsablauf*, rather than mere isolated tests, and the importance given to the collaboration of support or stimulation from several sensory fields.

Hartmann furnishes first a description of three cases, one of lesion of the left frontal lobe exclusive of Broca's region, the second a tumor of the posterior two thirds of the corpus callosum, with interesting dissociation of movements of the two sides, and one of hemorrhage into the middle of the right frontal gyrus. He discusses the left frontal lobe and its probable rôle in serial movements or the stream of activity (*Bewegungsablauf*), the importance of the corpus callosum in apractic disorders and the rôle of the right frontal lobe for the stream of activity.

His conclusions are as follows: Within Flechsig's anterior association center there must be mechanisms not so far outlined which are

inserted in the mechanism of motor cerebral activity and have the same relation to the motor centers of the extremities which the Broca region has for the dynamics of motor speech function.

The impetus to serial movements from the various sensory spheres of the cerebrum demand the coöperation of the frontal lobe for the imparting of their impulses on the motor zone.

The elimination of this function in the *left frontal lobe* leads to motor mind palsy of the opposite extremities (total apraxia).

The *right frontal lobe* requires the coöperation of the left hemisphere and connection with its sensory spheres in order that serial movements or the stream of activity be appropriately guided. Where the *left frontal lobe* alone is shut off from the right one, there is a loss in the continuity of chiefly those left-sided series of movements which depend on memory.

Where a greater part of the callosum is eliminated a conduction-apraxia of the left extremities with preserved memory of movements is the result.

The higher motor functions of the hemispheres when separated from each other show a difference on the two sides. The isolated left hemisphere merely requires an increased perceptive control of the serial movements by the sensory systems; the right side, however, becomes apractic but for its 'Eigenleistungen,' or autochthonous reactions, and the capacity for imitation of passive movements of its extremities. Complicated series of motions which depend on the coöperation of the two sides (bimanual and static-locomotor series) depend on the integrity of the interhemispheric association systems.

Defects of the right frontal lobe (marrow of *R.F.*) produce symptoms of partial conduction apraxia of the left side of the body with preserved motor memory.

According to these views the human frontal lobe would preside over movements of a higher dignity and complication, which in lower vertebrates would be provided for simply by the motor center.

A consideration of the cases shows how very difficult it is to determine how much the general initiative of the patient has suffered and to what extent the effect of a simple impediment in one type of reaction might easily impress one as a special defect in a supposed controlling mechanism. In view of the general tendency towards caution, the chief gain lies in the formulation of a more searching analysis of the sequences of motion.

DEMENTIA PRECOX.

Ueber die Psychologie der Dementia Præcox. Dr. C. G. JUNG.
Halle, C. Marhold, 1907.

The fruit of three years of experimental work and clinical observations, this study represents the most comprehensive analysis of the interesting set of phenomena of a very frequent type of disorder, which tends in a large percentage of the cases to blocking of further development and oftener to actual deterioration. It deals with the descriptive analysis and reconstruction of the manifestations and furnishes a very striking corroboration of Freud's principles of the processes in hysteria in this field.

Jung gives an excellent review of the existing literature. Throughout, there is a tendency to point to a specific *central* disorder, described with various terms; apperceptive deterioration (Weygandt), dissociation and abaissement du niveau mental (Janet-Masselon); decay of consciousness and dementia sejunctiva (Gross), decay of the personality (Neisser). Masselon and Neisser emphasize the tendency to fixation, and Neisser connects with it the emotional deterioration; Freud and Gross mention dissociated complexes, and Freud was the first to demonstrate that the same principles hold as in hysteria. The fixation of the complex and the deterioration in these cases would point to special effects of the affect (toxines?); but there is no reason to deny that such a fundamental change of metabolism might also come on as the primary factor and merely utilize existing complexes.

The first chapter contains many good analyses of work on associations by Pelletier, Stransky, Heilbronner, etc., and a review of the case of paranoid dementia analyzed by Freud.

The second chapter is devoted to the affective complexes and their general effect on the psyche, and the third one, to their influence on the quality of association; and in the fourth Jung gives a comparison of dementia præcox and hysteria. Finally he furnishes a full account of the analysis of a chronic and very complex case of paranoid dementia.

The whole work is a decided amplification of Freud's views, and must be studied in full as one of the best applications of the method. In the main, it is occupied considerably with explanation of the qualitative determination of the delusional and other developments, and hardly with the primary foundation of this type of developments in terms of habit-disorders. But his studies illustrate plainly how the type of abnormal trends of thought is not merely an illustration of

the downward course, but *as such* destructive and undermining. While the mechanism in hysteria and in dementia præcox is in many ways the same, the material with which the two work is strikingly different; and if we attribute a relative causal value to the complex in hysteria (in the sense in which we attribute a psychodynamic value to suggestion), we may possibly not be surprised that so far special toxins have not been found in dementia præcox, in as much as the constitutional make-up of the patient at the time of the outbreak and the kind of developments go a long way to account for the subsequent course of events. The durability of the automatisms and tendency to fixation seems best explained by the *qualitative difference of the material* in the two states. That they imply changes of metabolism would oftener seem incidental to the process than an original factor; in other words, it is the kind of concrete doings of the patient and the capacity and elasticity of his organism, and neither disorder of metabolism nor an abstract mental formula, that will bring to us the material for action and interpretation. The best kind of interpretation is the one that can claim to be the expression of successful action. So far the correction of some somatic incidents may have yielded the best, although but meager results. The difficulty of accessibility during many of the actual outbreaks and the usually hopelessly difficult constellations may deter further from a more rapid acceptance of a saner utilization of the dynamic issues in the mental sphere. But a wider and deeper knowledge of the not infrequent transient episodes of the 'dementia præcox' type will probably break down more readily than the analysis of a chronic case, the stubborn aversion against studying the mental life of such cases as we study disorders of respiration or metabolism or other disorders of the biological economy as types of activity with flesh and blood and at the same time with valuable points of attack observable and utilizable only in terms of mental habits and ways of digestion of mental experiences.

As a guide to some system in the sizing up of central complexes and the protean manifestations, and a most valuable extension of a dynamic psychology, Jung's work is a great achievement.

ASSOCIATION.

On Psycho-physical Relations of the Association Experiment. C. G. JUNG. Jour. of Abnormal Psychology, Feb., 1907, p. 247.

In connection with his further studies in association Jung reports some interesting experiments in which he has very cleverly made use of the so-called 'galvano-psycho-physical reflex.' Veraguth reported

in 1906 upon certain phenomena observed in a highly sensitive galvanometer when a low tension current is allowed to pass through the human body, the points of contact being the palms of the hands. When various stimuli were applied to the subject (tactile, optic, acoustic) it was found that the galvanometer indicated a lowering of the electrical resistance of the body not in direct relation to the strength of the irritation, but more especially in proportion to the intensity of the resulting psychical feeling tone; it was further noted that the variation in the galvanometer did not appear at the moment of the perception of the stimulus but after a latent period of a few seconds. It was later discovered that it was not necessary to actually apply a sensory irritation; for the galvanometric oscillations occurred when the subject was merely led to expect a stimulus. From these observations Veraguth concluded that in this experiment the feelings were objectively represented.

Jung has perfected a means of representing graphically the oscillations of the needle on a revolving drum and in this way curves are traced on smoked paper. The subject is given the stimulus words as in the usual association experiment;¹ a pretty uniform tracing is obtained until some complex of ideas associated with strong affect is touched upon. Then there occurs a deviation of the needle in the galvanometer and a corresponding rise in the curve traced on the drum. As examples some curves obtained during the association experiment are reproduced together with brief histories of the cases to show that the psycho-analysis pushed along the lines suggested by the variations in the curves lead to the discovery of certain strong emotional complexes. Jung believes that these experiments afford a means of demonstrating the feeling tones which accompany the associations. The physical and physiological principles involved are hidden in obscurity.

G. H. KIRBY.

NERVOUS SYSTEM.

The Integrative Action of the Nervous System. CHARLES S. SHERINGTON. New York, Charles Scribner's Sons, 1906.

Zur Analyse der Reflexfunctionen. Eine kritische zusammenfassende Darstellung. SILVESTRO BAGLIONI. Wiesbaden, J. F. Bergmann, 1907.

These two works present from different standpoints some fundamental facts of nervous function, Baglioni proceeding from the spinal

¹For reviews of Jung's work in this field, see analysis by Adolf Meyer, *PSYCHOLOGICAL BULLETIN*, 1905; also a review by August Hoch, *Journ. Abnormal Psychology*, Vol. I., No. 2.

frog and experiment on cephalopods, Sherrington viewing the mammalian organism as a whole and studying the mechanism of the reflexes and their welding together into the biological unit, described as integration of activities.

Baglioni gives a brief but excellent picture of the multiplicity of the real reflexes and their distinction from mere electrical stimulation of the nervous system, and the necessity of considering as essential the adequate stimulus of the peripheral organ. The reflex mechanism consists of the motor or efferent elements, and of the coördination mechanism, consisting of all the other central and the afferent elements. In phenol he has found a poison selecting the motor elements, whereas strychnine is shown to be a poison of the coördinatory mechanisms. The fact that the increased excitability produced by strychnine leads to no automatic discharges, speaks strongly against the conception of absolute automatism. The book is well written and too concise and rich in excellently chosen material to lend itself to a brief review.

With a somewhat complex nomenclature, but with a standpoint which should appeal to the psychologist, Sherrington gives a review of a large array of facts of nerve-physiology which can safely be called the best and broadest collection of first-hand experimental studies on higher vertebrates available to-day. Instead of building up the animal out of elementary reflex units, he aims to show what constitutes the individual and how the parts are welded together. The result is an open-mindedness for those processes which cannot be reached as yet by ordinary neurophysiology, but which form an intrinsic part of what interests one beyond neurological issues.

The psychologist is already familiar with his interesting experiment in eliminations of the visceral sensations from emotional reaction in the dog, and the most interesting study of the independent appreciation of binocular stimulation. The systematic elaboration of the whole material gives a picture which forms a striking contrast to the traditional simplicity. The work is to such an extent bound to be the guide in this field that an abstract is unnecessary.

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- Vortex Philosophy or the Geometry of Science.* C. S. WAKE. Chicago, the Author, 1907. Pp. 36.
- Interpretaciones sociales y éticas del Desenvolvimiento mental.* J. MARK BALDWIN. Trans. by A. POSADA and G. J. DE LA ESPADA. Madrid, Jorro, 1907. Pp. 579.

NOTES AND NEWS.

As a memorial to Paul Julius Möbius, Dr. Bresler, Professor Edinger, Professor Moeli and others are establishing a Möbius fund, the interest of which will be used annually as a Möbius prize for a worthy piece of work from the field of neurology or psychiatry, one year a contribution on an assigned topic, to be published in the *Psychiatrisch-Neurologischen Wochenschrift*; and the other year for the most worthy article or monograph on psychiatry or neurology published during the previous two years. Contributions or promises of the same are to be directed to Curt Reinhardt, Leipzig, Lessingstrasse.

A German edition of Professor Baldwin's *Thought and Things* is announced by Herrn Barth of Leipzig. The first volume is being translated by Wm. F. G. Geisse and will appear in the autumn. A Spanish translation of the same author's *Social and Ethical Interpretation* has just appeared from the press of Jorro of Madrid, done by the eminent Spanish sociologist, Professor Posada.

At the recent celebration of the centennial anniversary of the founding of the University of Maryland, the honorary degree of LL.D. was conferred upon Presidents F. L. Patton of Princeton Theological Seminary and G. Stanley Hall of Clark University, who were also the principal speakers.

Dr. W. D. Furry Ph.D. (J. H. U.) has been appointed Johnston Research Scholar in the Department of Philosophy of the Johns Hopkins University.

THE PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE FIFTEENTH ANNUAL MEETING
OF THE AMERICAN PSYCHOLOGICAL ASSO-
CIATION, NEW YORK CITY, DECEM-
BER 27, 28 AND 29, 1906.

REPORT OF THE SECRETARY.

The fifteenth annual meeting of the American Psychological Association was held at Columbia University, New York City, on Thursday, Friday and Saturday, December 27, 28 and 29, 1906, in affiliation with the American Association for the Advancement of Science, the American Society of Naturalists and the American Philosophical Association. About one hundred members of the Psychological Association were in attendance, while many of the sessions attracted visitors from the affiliated societies. The total attendance at all the affiliated societies was very large.

The special meetings of the Association were held in the Psychological Laboratory, and the program of these is represented by the abstracts given below. Of the more general meetings in the which members of the Association participated, special interest attached to the address of Professor William James, as President of the Philosophical Association, on the 'Powers of Man.' Also to be mentioned are the opening address of welcome to the affiliated societies by President Butler, and the reception, on Thursday evening, by the President and Trustees of Columbia University, followed by a general smoker at the Faculty Club, the dinner of the Naturalists on Friday evening, followed by a joint smoker of the Philosophical and Psychological Associations, the luncheon tendered by the President and Trustees of the College of the City of New York, at their new buildings, which were inspected by the members of the various societies, and the reception at the American Museum of Natural History, on Saturday even-

ing, by the Trustees of the Museum and the Council of the New York Academy of Sciences.

An exhibition of recent scientific progress was held by the New York Academy of Sciences, at the American Museum of Natural History, during the period of the meetings. One section of this exhibition was devoted to psychology, and contained, among other things, a collection illustrating the various methods which have been devised by members of the Association for recording eye movements. Apparatus or results were demonstrated by Messrs. Delabarre, Huey, Stratton, Judd, Dodge and Dearborn. Professor Dodge also exhibited his transparent mirror exposure apparatus and an instrument for quickly determining the degree and plane of astigmatism; Professor Judd exhibited some of his apparatus for measuring geometrical illusions, with charts of results; Dr. Adolf Meyer exhibited some reconstructions, by means of superposed glass plates, of the occipital lobe and its fiber systems; Professor Henmon showed his quantitative test for color blindness; and Dr. Wells some simultaneous records of laryngeal and respiratory action in speech. Some recent foreign apparatus was also exhibited by members of the association, including a flicker photometer and Nagel's tests for color blindness, contributed by the Yale laboratory, and a set of Hegg's stable colors, contributed by Mrs. Franklin. Some other novelties were on exhibition at the Columbia laboratory, and were informally inspected, especially at a 'Conversazione of experimentalists,' which was arranged for Thursday afternoon.

The opening session of the Association was devoted to a discussion on the question of Organized Coöperation in Standardizing Psychological Tests. The discussion was opened by Messrs. Angell, Dodge, Judd, A. H. Pierce, Pillsbury and Warren. Considerable divergence of opinion came to light as to the proper aims and scope of such organized effort, and even as to the propriety of organizing it at all at the present stage of progress; the upshot of the discussion was however the appointment of a committee for further consideration of the matter and report to the Association at the subsequent business meeting.

At the annual business meeting, held on December 28, the following business was transacted: Election of officers for 1907: *President*, Dr. Henry Rutgers Marshall of New York; *Members of the Council to serve three years*, Professor C. H. Judd of Yale University, and Professor W. B. Pillsbury of the University of Michigan.

The following new members were elected: Dr. Jessie B. Allen, Los Angeles State Normal School; Dr. Roswell Parker Angier, Yale

University; Dr. Harvey A. Carr, Pratt Institute; Dr. Walter Fenno Dearborn, University of Wisconsin; Dr. Knight Dunlap, Johns Hopkins University; Dr. Samuel Perkins Hayes, Mount Holyoke College; Dr. Ernest Norton Henderson, Adelphi College; Dr. August Hoch, Bloomington Asylum; Professor William H. Howell, Johns Hopkins University; Professor H. S. Jennings, Johns Hopkins University; Dr. Fred Kuhlmann, Clark University; Dr. Paul R. Radosavljevich, New York City; Dr. Frances H. Rousmaniere, Mount Holyoke College; Professor John Edward Russell, Williams College; Dr. John Frederick Shepard, University of Michigan; Professor Edwin Diller Starbuck, State University of Iowa; Dr. F. M. Urban, University of Pennsylvania; Dr. F. Lyman Wells, Columbia University; Professor C. O. Whitman, University of Chicago.

In connection with the election of new members, the Council made a formal announcement to the Association of the principles which guided them in nominating or declining to nominate individuals proposed for membership. The Constitution reads that those are eligible for membership who are engaged in 'the advancement of Psychology as a Science.' In interpreting the Constitution, the Council has, historically and consistently, recognized two sorts of qualifications for membership: professional occupation in psychology, and research. The Council now adheres to a somewhat strict interpretation of the former of these qualifications, so that, in the absence of research, positions held in related branches, such as philosophy and education, or temporary positions, such as assistantships, in psychology, are not regarded as qualifying a candidate for membership.

The Treasurer's report, audited by the Council, was read and approved.

The Council reported that invitations for the next annual meeting had been extended by Cornell University and by the University of Chicago. On recommendation of the Council, it was voted to accept the invitation of the University of Chicago, power being given to the Council to arrange otherwise in case circumstances should arise to make a change of plan seem desirable.

The Council reported that, acting as a committee instructed by the Association at its last meeting to recommend action on the question of a bibliography after an examination of the bibliography of Dr. Rand, it regarded it as injudicious that anything further be done in the matter.

The Council made a report of progress in the matter of the guardianship and utilization of the accumulated fund, which matter had been referred to it at the preceding annual meeting.

On recommendation of the Council, it was voted that the Secretary of the Association be the Association's delegate to the Council of the American Association for the Advancement of Science.

The Council recommended an amendment to the Constitution to the effect that 'by unanimous vote the Council may drop any member of the Association who has not been engaged in the advancement of Psychology for a period of five or more years.' By vote of the Association, this matter was referred back to the Council.

The Council further recommended that Article IV. of the Constitution be amended by the substitution of the words 'two dollars' in place of 'one dollar,' as the annual subscription. This also was referred back to the Council.

The Committee appointed December 27, 1906, to consider the question of the appointment of a committee on measurements, reported as follows:

Your committee recommends the creation of a permanent committee of the Association, to consist of five members, which shall act as a general control committee on the subject of measurements. It is recommended that this committee undertake two general lines of work, organizing as many subcommittees as it shall see fit, and calling to its assistance such outside help as it may desire: first, the determination of a series of group and individual tests, with reference to practical application; and second, the determination of standard experiments of a more technical character. Examples of the second sort of problem would be the means of determining the limens of sound and of color. It is particularly recommended that the committee make the most explicit possible recommendations upon forms of apparatus, modes of procedure, and formulation of results. It is recommended that one session of the 1907 meeting of the Association be devoted to a consideration of the report of this Committee. It is finally recommended that the initial membership of the Committee be determined by the Council before the adjournment of the present meeting of the Association.

Respectfully submitted,

J. R. ANGELL, *Chairman*,
W. B. PILLSBURY,
H. C. WARREN,
C. H. JUDD,
C. E. SEASHORE,
E. A. KIRKPATRICK,
R. S. WOODWORTH,

Committee.

This report was adopted as the action of the Association, and the Council was instructed to appoint such a committee. (At a meeting of the Council held after the meeting of the Association, Messrs. Angell, Judd and Pillsbury were appointed as three members of the Committee, with power to select the remaining two. The membership of the Committee was completed by the addition of Messrs. Sanford and Woodworth; later, on the resignation of Professor Sanford, Professor Seashore was selected.)

A vote of thanks was tendered to Columbia University and to the College of the City of New York, for their hospitality.

It was voted that the Council appoint a representative of the Association to meet, with representatives of the American Association for the Advancement of Science, to consider the relation of the Psychological Association to the corresponding Section of the American Association. (At a subsequent meeting of the Council, Professor Cattell was appointed as such representative.)

REPORT OF THE TREASURER FOR 1906.

DR.

To balance from last meeting.....	\$2,768.82
Dues from members	173.10
	<u>\$2,941.92</u>

CR.

By expenditures for

Stationery and printing.....	\$85.10
Postage	25.00
Clerical assistance.....	71.30
Proceedings	11.05
Smoker at Cambridge	21.68
Travelling expenses	28.00
Expenses Committee on Bibliography.....	2.39
Telegrams	3.20
	<u>247.72</u>
	\$2,694.20

Accumulated interest 75.97

Amount in bank December 28, 1906.....\$2,770.17

Audited by the Council.

WM. HARPER DAVIS,

Secretary and Treasurer.

ABSTRACTS OF PAPERS.

The Visual Estimation of Spatial Magnitudes. SIMON NEWCOMB.
A Scientific Criterion of Literary Merit. F. LYMAN WELLS.

A study in relative position applied to literary standing. It is possible to obtain the order of merit in ten of the foremost American writers with an average probable error of only one half of the consecu-

tive differences in position. It is possible to estimate general merit more accurately than the qualities which constitute it. The order of importance of the various qualities corresponds with the order of accuracy with which it is possible to estimate them. The most and least prominent characteristics of a writer's work may also be obtained, as well as the accuracy with which his work can be analyzed. The results are a confirmation of the validity of the method, subject to proper interpretation.

Photography of Ocular Movements. GEORGE M. STRATTON.

Negatives obtained by photographing the eye's action under various conditions were shown in projection — records taken while viewing rectangles and circles in actual drawing, as well as while 'describing' these forms in imagination, by sweeps of the eye over a blank surface. Records were also included of the eye's action toward more complicated figures, and in attempting to pass in various prearranged directions from a central fixation point.

The method of reaching a correct interpretation of the records was shown, by which an allowance is made for the error due to the shifting of the reflected light upon the cornea, as well as to the irregularities of the cornea itself. The basis of correction is reached when a large series of fixations which form lines and figures are carefully photographed. When such records are superposed upon those obtained during free ocular movements the character of the eye's aberrations may be confidently and distinctly traced.

In judging the value of these records, in comparison with those of Dodge and of Judd, the special advantages of each method should be freely recognized. The signal virtue of the present method is that it gives a record, not only of the points of rest of the eye, but — most important of all — of the actual path which the eye pursues in passing from one fixation point to another. The points of rest, *without these interconnecting movements*, are faithfully recorded by Dr. Judd's method. The *time-features* of the eye's action, without the space form of its movements, are uniquely given in Dr. Dodge's work. Only the peculiar interest which dominates a piece of research can decide which is the best method to employ, for each procedure gives results which so far have been obtained in no other way.

Minimum Exposure in Experimental Studies of Reading. RAYMOND DODGE.

The tendency to reduce the physical exposure time in tachistoscopic study of reading to a minimum is a methodological error. It

is based chiefly on the psycho-physical fallacy that reduction of the duration of the stimulus decreases the complexity of the consequent psychological process. The contrary is the fact. Extreme reduction of the exposure time introduces into the experiment new and unusual conditions altogether foreign to the reading process. Whenever the products of these unusual conditions are mistaken for experimental disclosures, as in the discussions of Zeitler and Messmer, it leads to a distorted analysis of the processes of apprehension. While it renders the experimental conclusions, in so far as they are referred to natural reading, not only valueless but false.

The Rotation of the Eye During Fixation and in Movement.

CLOYD N. McALLISTER. (Read by title.)

Studies in Binocular Depth Perception. J. CARLETON BELL.

In the dark room two dots of light, 2 mm. each in diameter, are movable in a horizontal plane, 40 cm. from the eyes. The dots are observed through 11° prisms, so that, within certain limits of separation, corresponding points on the two retinae are stimulated, and a single image is seen. When the dots are brought closer together the single image appears to approach; when they are separated more widely the image recedes. The amount of movement of the dots necessary to give rise to the judgment of approach is approximately the same for all parts of the scale, and the same is true of recession. This threshold is fairly constant for the same individual at different times, but varies greatly with different individuals, and is uniformly lower in all individuals for approach than for recession. When the dots are moved at a rather rapid rate the recession is perfectly smooth and uniform, while the approach is marked by definite jumps or swoops, shorter at the extremes of the scale, longer in the center.

The absolute distance of the image is estimated with remarkable constancy by the same individual at different times, but there is wide variation in individuals, more particularly in the estimation of the absolute distance of the image at the higher degrees of separation of the dots.

When the introspection as to the clearness and size of the image is compared with the estimates of absolute distance, we are led to the conclusion that we have to do here with two types of individuals; in the one, accommodation and convergence are closely associated, and along with lessened convergence goes a correspondingly relaxed accommodation, giving a blurred and enlarged image. In the other type there is a practical dissociation of accommodation and convergence, so that, even with the greatest divergence, the image remains

clear and of constant size. The distance estimates of the first type for a wide degree of separation vary between 20 and 25 feet, those of the second type for the same degree of separation vary between 2 and 4 feet.

Address of the President: *The Province of Functional Psychology.*

JAMES R. ANGELL.

(This address has appeared in full in the *PSYCHOLOGICAL REVIEW*, 14.61, 1907.)

Feeling Analysis and Experimentation. CHAS. HUGHES JOHNSTON.

The striking phases of the feeling problem are its particular prominence, the theoretical implications involved for the science of psychology, some evident shortcomings and oversights in recent analysis and experimentation, the limited aim and questionable import of reported experimental results, the peculiar difficulties which present themselves when one seeks to deal with affective psychoses experimentally, and finally the possible lines of departure from present methods of research which a survey of the work demands.

The first two considerations may demand a less restricted definition of psychology, and seem particularly to reveal the inadequacy of a purely structural description and explanation. The remaining considerations suggest on the whole that a workable distinction should be made between sensations and feelings, and that feelings should be classified and physiologically described, not by localizing them in certain invariably occurring bodily processes, but rather by grouping them with reference to the various kinds, degrees, rates, etc., of coördinated adjustment which seems to characterize them. Thus, the content aspect of sensations being referred to the sensory, and the subjective or intent aspect of feelings in experience being referred to the motor processes exclusively, we have the basis for describing two elements in such a way that recognizes their independent variability. Feelings have their own quality, intensity, and vividness incommensurate with the same attributes of the sensations that occur simultaneously, and hence are not characterized by even organic complexes viewed in sensation combinations.

Some Results of Experiments on Cerebral Circulation in Sleep.

JOHN F. SHEPHERD.

This paper concerns only the volume reactions in normal sleep and while the individual is lying down. Two subjects were used in the experiments. With the first subject the volume of the brain and of peripheral parts increases when the individual goes to sleep, and

decreases when he awakes. There is often a temporary fall of the brain volume preceding the more marked rise which shows itself as sleep becomes deeper. There is a prominent breathing wave in the plethysmographic records from both brain and periphery. This wave is such that the fall in the circulation record very nearly corresponds to an inspiration, the rise to an expiration. If there is any difference, the fall in the brain volume shows itself a fraction of a pulse beat before the respiration curve begins its descent. Stimuli that disturb but do not awaken the subject cause a temporary increase in breathing in both chest and abdomen, a fall of volume of the brain and peripheral parts with comparative elimination of the breathing wave therein. When the subject is sleeping soundly and there are apparently no distinct stimuli acting, one often finds a more or less rhythmic repetition of such changes, analogous to the Traube-Hering wave. There is always some evidence of this wave, and the changes in brain and periphery are always parallel.

The second subject has been acting only recently. The results with him have not been so decided. There is usually no doubt of an increase of volume of the brain when the subject goes to sleep. And in several cases there is a marked fall with awakening. The Traube-Hering wave in the volume and in the breathing is not so prominent, but it is still present, and its relations are the same. The breathing wave in the brain curve, on the other hand, often but not always seems to follow the depth of breathing, and to be larger while the subject is awake. The variations may be due in part to the fact that the subject was more nervous and never slept very soundly nor very long during the experiments, and in part to the greater difficulty in eliminating movements, particularly those of respiration.

The Difference Between a Habit and an Idea. STUART H. ROWE.

Much confusion has resulted pedagogically from a failure to distinguish between ideas and habits in methods of teaching. Educators have extolled the value of habit but have taught as though it were to be gained by the same procedure as knowledge. Psychologists in their interest in the minuter problems of science have failed to impress the pedagogue with the seriousness, if not the ridiculousness, of his error. To this end an examination of the important differences will not be amiss.

1. The first essential difference is that habit is automatic in character. Its initial features suggest only one set of consequent features. On the other hand the initial phases of an idea are not followed by any given consequents directly.

2. Habit is always a serial affair. It begins with one avenue of approach and continues along an established succession of associations. The idea however has many avenues of approach and once reached may lead to this association and now to that with a freedom quite different from that fixedness which distinguishes habit.

3. Habit represents a conserving tendency in mental life. On the other hand the idea in its very function adapts itself to additional points of view and modification.

4. As a habit becomes more and more fixed, we lose sign of the details involved and the feeling element tends to fade out; but an idea is dependent on its detail for its serviceability. Even an abstraction loses its vitality if stripped of its data. Moreover in contrast with habit the feeling phase of the idea fluctuates, that is, it becomes more prominent or less so as new aspects of a situation strengthen or weaken the prevailing mood.

5. Progress in a definite line of habituation is accompanied by a release of attention and a reduction in the fatigue accompanying the effort. Ideation implies attention; and, if the idea grows more complicated and so requires a greater effort of attention to keep its various phases focalized, greater fatigue results.

6. Habit implies repetition, practice over the same neural path. An idea may be gained through a single experience.

7. A habit is specific, although this fact does not preclude for it all suggestiveness beyond itself. The idea however is not well defined. It is manifoldly suggested and suggesting. It may be regarded from many points of view and takes on varied aspects in accordance with them.

8. There is an extensive groundwork of reflex and instinctive inheritances, out of which special habits of adaptation develop as complex adjustment to the environment is accomplished. The child's first steps in ideation are seriously handicapped by the lack of any such groundwork for ideas.

The Relation of Imitation to the Theory of Animal Perception.

GEORGE H. MEAD.

Imitation, in the full sense as used by Hobhouse, demands in an animal a perception of his act and of its consequences — such a perception as would make the animal aware of some 'character' of the event in such a way as to utilize this character in subsequent reactions to the stimulus. In Mr. Thorndike's analysis this conception of animal behavior is replaced by a conception of the association of impulse with stimulus instead of the association of states of consciousness as such.

By a system of trial and error the animal's impulses are provided with appropriate stimuli. The cement for this association he finds in pleasure and pain. This association of impulse with sense stimulus leaves no room for imitation in Hobhouse's sense, though there might still be mimicry and automatic imitation.

Perception cannot properly be inferred from such animal conduct as finding the way through a maze, for there each step simply provides the stimulus for the next, and there is no necessity that the intermediate acts should be perceived as mediating the outcome. But where the intermediate acts must be adapted to final results, and where they can be inhibited, so that there exist relations of mutual control between the intermediate acts and the final act, there we should have, in a possible consciousness, just the contents which are called for in perception. The type of reaction which best lends itself to this mediating experience out of which perception may arise is the type represented by tricks which require some sort of manipulation as the means to the final act, *e. g.*, the opening of a door by various devices, the use of a stick, etc. This type is of interest because it recalls the fact that our own *perceptions* consist so largely in the interpretation of what comes through the eye, the ear, and other distance sensations, through the suggested kinæsthetic experience of possible contact. This fact, which lies at the basis of the older distinction between the primary and secondary sensations, and finds further expression in the inevitable presentation of the outer world in terms of solid matter, *i. e.*, in the imagery of actual manipulations, this fact suggests that a rich kinæsthetic experience in manipulation may be almost a precondition of perception, that is, that the sort of mediate experience in which stimulus and response would mutually control each other in the adaptation of one act to another could hardly arise before the primate with his highly sensitive flexible hand.

If we accept this or an analogous definition of perception it would follow that imitation could not arise as a conscious phenomenon before such mediate acts appeared. One cannot have imitation in this sense without perception, and given perception it is hard to see how imitation can lag far behind.

Kinæsthetic Sensations: Their Rôle in the Reactions of the White Rat to the Hampton Court Maze. JOHN B. WATSON.

After determining a normal average record of the time taken by adult rats in learning the maze, tests were made to determine the sensory factors used in learning it. Removing the eyeballs, plugging the ears and destroying the tympanic membrane, extirpating the olfac-

factory bulbs, cutting the vibrissæ, anæsthetizing the soles and snout — none of these subtractions of sense data prevented normal reactions in animals which had already learned the maze, nor lengthened the time of learning. Disturbances of temperature were likewise without effect. Nor did a loss of more than one of these senses by the same animal seem to alter the result. Rotating the whole maze through an angle did seriously disturb the acquired reaction, though readjustment occurred promptly.

Habit Formation in the Starfish. H. S. JENNINGS.

An account of experiments showing that by a course of training the starfish may be induced to use habitually a certain pair of rays on which to turn in the righting reaction. The habit lasted in certain cases three or four days.

Modifiability of Behavior in the Dancing Mouse. ROBERT M. YERKES.

Visual discrimination tests show that the dancer avoids a disagreeable stimulus after about one hundred experiences. This modification of behavior occurs more quickly in the male than in the female. It persists for from two to six weeks.

Labyrinth tests are serviceable in the study of the dancing mouse only when the avoidance of some unfavorable condition is demanded. Neither escape from confinement nor the obtaining of food furnishes satisfactory motives for the following of a labyrinth path. The animal can find its way readily in a simple labyrinth without the guidance of sight, smell and touch. Thus far my experiments indicate the superiority of the female in the acquirement of labyrinth habits.

Even after a habit is no longer apparent relearning takes place far more quickly than the original modification in behavior. In other words, modifiability is increased by modifications of behavior.

Further Study of Variability in Spiders. JAMES P. PORTER.

In continuation of an earlier report, facts and observations were given, and illustrated with lantern slides, to show the great variability of spider webs and cocoons.

The Effect of Distraction upon the Intensity of Sensation. I. MADISON BENTLEY.

The relation of attention to the strength of sensation has, for years, been a vexed question to which casual observation and experiment have alike failed to return a final and satisfactory answer. The inherent difficulty of the problem is reflected in the wide range of current opinion. One psychologist, *e. g.*, holds to an unqualified, another to a

qualified intensification through attention, still another declares for the absence of positive effect, while a fourth maintains that attention actually impairs the strength of sensational processes.

New experiments undertaken with the fall-phonometer indicate that distraction diminishes by approximately the same relative amounts the intensity of weak and of strong momentary noises. Further research is needed to show (1) whether the observed diminution is a general function of distraction, and also (2) whether a thorough analysis of the 'distracted' consciousness will not reveal more specific relations than are at present recognized as existing between the state of attention and the intensity of individual sensations.

A Contribution to Applied Tone-psychology. C. E. SEASHORE.

The discussion was limited to the significance of the power of discrimination for musical pitch in individual psychology. On the basis of measurements on university students, high school pupils, and grammar school children, it was shown that the distribution of the pitch-discrimination capacities does not follow the distribution of records of discrimination in other respects, *e. g.*, intensity of tone or visual space; it is not correlated with general intellectual capacity; it does not show close correlation with musical education; it does not show close correlation with acuity of hearing, but resembles the distribution of acuity of hearing; and the physiological threshold rises with age — children are more sensitive to tone differences than adults.

The individual differences (*e. g.*, from one-hundredth to a half of a tone) are due to differences in physiological structure. There is no reason for supposing that training can improve the peripheral organism for pitch discrimination any more than training can improve the physical basis for acuity in hearing. Experiments were cited to show that it is possible to make a satisfactory rating of a child's capacity in this respect in a brief test, and that twenty days of specialized training in this acuity give no evidence of improvement with practice. Pitch discrimination is one of the fundamental requirements for ability in production and enjoyment of music. It is possible and worth while to measure a child's capacity in this respect before beginning a musical education.

Tonal Reactions. E. H. CAMERON.

The apparatus used consisted of a diaphragm and levers which traced the record upon a smoked paper surface. The most important results may be summarized as follows:

1. In the singing of a tone a sudden marked rise in pitch usually occurs immediately after the beginning of a tone.

2. No tone is sung entirely uniformly. It oscillates in pitch from moment to moment in a somewhat irregular rhythmical manner.

3. Very marked differences exist in different individuals with respect to their ability to imitate standard tones. The subjects tested varied from a deviation of a small fraction of one per cent. to thirteen per cent.

4. There is manifest throughout a tendency to sing a tone higher than it should be sung. The end of a tone is usually higher than the beginning and a sung tone is almost unavoidably higher than the tone imitated.

5. Distractions when causing disturbances may affect the whole of the sung tone or only the beginning of the tone. In either case the effect of the distraction may be to cause the sung tone to vary from the standard (1) in the direction of the distracting tone; or (2) in the opposite direction from the distracting tone.

6. Sung tones varying from a standard under the effect of distractions are usually harmonious with the distracting tones. When the distracting tone is inharmonious with the standard tone, distraction is more likely to occur than when the two tones are harmonious.

A Proposed Method for Teaching Æsthetics. ELEANOR HARRIS ROWLAND.

I. Aims of a course in Æsthetics. Difficulty of carrying it out because with many American students there *is* no æsthetic feeling. This feeling must be *aroused* as well as analyzed and explained.

II. Ease and difficulty in arousing æsthetic feeling for different Arts. (a) Can arouse it with lyric, epic and dramatic poetry, prose and music because we have access to *originals*. (b) In most colleges we do *not* have originals for the arousal of æsthetic feeling in painting, sculpture, architecture. We cannot expect real æsthetic feeling for paintings, seen only through photographs, with *color* elements lacking; or for sculpture seen only in casts with fine modeling entirely absent or through photographs, where size is altered and the third dimension lacking. (c) Students do not come in contact with *modern* art at all, except through the magazines. How can they discuss intelligently an art they have not seen, or a mental state they have not experienced?

III. *Remedy*.—Museum Extension Movement. (a) Loan exhibits. (b) Conduction of students through museums with artists to explain masterpieces. (This has started in Boston, but other Museums have become interested as well.)

IV. *Method*.—(a) In discussion of arts, literature and music

bring samples before student, and be sure he *enjoys* them before any further work is done. (b) If they aren't sure they enjoy them, place *poor* art beside them to emphasize difference. (c) Show *photographs* of painting and sculpture to find what they get from them alone; and then take students through museum to show them *originals*.

V. There is a demand from grade schools for systematic æsthetic work to be combined with history. Any such help must come from colleges.

An Attempt to Harmonize the Current Psychological Theories of Judgment. W. B. PILLSBURY.

Four theories of judgment are current to-day in different more or less psychological circles or are implied in popular usage. These are the definitions of Marbe, that judgment is comparison: the definition of Ehrenfels and of Ribot in his *logique des sentiments*, that judgment is evaluation: the neo-Hegelian definition that judgment is ascription of meaning to the given, and the theory of the Dewey school that judgment arises from conflict and doubt. There are elements of agreement in each that are often overlooked, but which become evident if we analyze the processes immediately involved. Comparison, as the investigation of Marbe and others shows, has no particular mental accompaniment other than the simultaneous or successive presence in consciousness of two objects with the preliminary question how much? or how long? or east or west? Even in comparisons over long periods there is still no sign of weighing or other ascertainable mental action and in many cases not even the immediate presence in consciousness of the first member of the pair. Rather the comparison is by reference to a common standard, often formulated in a word. In evaluation exactly the same process goes on except that the standard is an immediate term in the comparison and is often incapable of formulation in language or definite imagery. Both judgments are comparisons, in each there is nothing in mind but the question that precedes and the assertion that results, and in each the point of reference is a standard that has grown through long experience to serve as a norm of appreciation. The third definition is almost identical if we may be permitted to give psychological body to the spirit of meaning. If meaning is anything it is the set of standards or schemata that have grown up to rectify experience and these are always called out by any sensation. We see objects not as they are but as we know they ought to be. Standard rectangular table tops are seen, not the trapezoid that is on the retina. The standard or meaning that attaches depends upon the mood or problem that is in mind as one looks and the first

consciousness is of the complete standard object not of the meaningless sensation, just as in comparison the essential elements are the question in mind and the resulting appreciation. Evaluation is an intermediate stage between comparison and the more usual process of attachment of meaning as we see it in perception, as comparisons in memory mediate between evaluation and simple comparison. All three are alike in so far as they depend upon the situation and result immediately in an interpretation of the situation. The two last are alike in the reference to a preëxisting standard. The fourth theory that belief grows from doubt resolved is like the others in its insistence upon the situation or problem, but would restrict the definition to the peculiar cases where two or more solutions are possible. The restriction of the term depends not altogether upon the real conditions of the action nor upon the result, but rather upon the feeling that accompanies. This seems rather a slight reason for abandoning current and historical usage.

A Classification of Perceptual Processes. KATE GORDON.

The most general characteristics of consciousness are probably the four so-called attributes of sensation, quality, intensity, duration and extensity. Quality is properly to be called an elementary, sensational, or felt aspect of conscious life, but intensity, duration and extensity seem to me to be better designated as types of perception or ways of apprehending that quality. Perception always involves some elaboration of the stimulus, some reference to other things, and there is now a tendency in psychological thought to make the thing ultimately referred to, some aspect of the motor response to the stimulus, in other words, you do not perceive a thing until you see to some extent what to do about it. My thesis is that these different kinds of perception—the intensive and the extensive (including the temporal and spatial)—have been derived from and have now some reference to the different phases of primitive motor responses. These responses are said by some writers to be contraction from pain and expansion to pleasure. Stanley speculates that ‘strenuousness through and by pain is primal.’ In reacting then from a painful stimulus certain types of movement are made, and these movements form the basis of our perceptions of intensity, duration and extensity. Thus the first form of reaction to pain is a contraction of the organism. This means to the organism a breaking of certain contacts with the environment and a tension towards a fixed center within the organism, in other words it means an experience literally of concentration and intensity. The mere presence of the stimulus, *i. e.*, the mere fact of pain is a quali-

tative or sensational experience, but the stimulus as an intensive magnitude is perceived in terms of the amount of the subject's own contraction. If, however, this first intensive reaction is not sufficient to break the contact with the painful stimulus then something different in kind must be done. Now a thing which cannot be avoided may often be modified so as to diminish its painfulness, and a stimulus which, if taken all at once, is painful can be made more agreeable if taken in gradually or in extended form, *i. e.*, a stimulus which can be 'spread' whether temporarily or spatially has thereby its intensity reduced. Movements, then, which tend to diffuse an impression are at the bottom of our perceptions of duration and extent. The progress from intensive to extensive perception is also a progress from the relatively implicit to the more explicit kind of apprehension and represents greater control over environment.

Imagery Illusions. The Non-visual Character of the Proof-reader's Illusion. A. H. PIERCE.

(1) The usual description of the proofreader's illusion is to the effect that the wrong word is seen, perceptually, by the reader. The fact seems rather to be that only certain fragments of the word are seen and that these arouse a verbal *image* that is not in accord with the text. The verbal image differs with the individual. It may be articulatory, or auditory, or, in the case of purely visual readers, visual. But in any event the illusion consists in the non-correspondence between an image and the printed word rather than in the presence of an erroneous perception. The mistake may be called an illusion because, functionally, the results are the same as if the experience had been entirely perceptual. But to distinguish this variety of mistakes from others they may perhaps well be called imagery illusions. (2) Illusions may be classified on the basis of their persistence and consequent examinability. Thus most of the geometrical-optical illusions are stable and permit of examination without danger of being destroyed, while illusions like the taking of a hat and coat to be a man are likely to dissolve and elude examination, and imagery illusions are by their very nature such that they permit of no reinstatement and thus of no examination whatever.

Non-sensory Components in Sense Perception. R. S. WOODWORTH.

A percept is not properly described as a synthesis of sensation and image, for the image is often not present when the percept is perfectly clear and definite. It is better to call the percept simply a 'mental reaction' to sensory stimulus, and to recognize that a reaction, as a new event, probably has a quality of its own, which may be called a

'percept quality.' (This paper appeared in full in the *Journal of Philos., Psychol. and Sci. Methods* for March 28, 1907.)

The Mental Antecedents of Voluntary Movements. EDWARD L. THORNDIKE.

Evidence was presented to show that: First, the images of the resident and remote sensations caused by a movement are common accompaniments of willing *not* to make it and are therefore very likely irrelevant to its actual volition; second, we can will acts, images of whose resident and remote sensations are utterly unobtainable; third, we do as a rule will acts in the case of which such images are obtained rarely and with great difficulty. Attention was also called to the fact that pragmatically at least such images are commonly irrelevant factors, since in trying to get anyone else to make a voluntary movement we rarely use means specially useful in calling up such images and often do take means specially to prevent their appearance, and also to the fact that to insist on the image's effective presence implies a sharp division of an unlikely sort between voluntary and involuntary action. It was suggested that the belief in images of the movement as necessary antecedents of the movement was a relic of the disposition, common in the childhood of psychology, to crave that a mental state, to be efficient, should *be* like what it *does* or brings to pass. (This paper appeared in full in the *Journal of Philos., Psychol. and Sci. Methods* for January 17, 1907.)

The Influence of the Duration of Movements upon the Estimation of Their Lengths. JAMES H. LEUBA.

The precision of our estimation of movement has been found to be independent of the position of the moving limb (provided the change of position did not bring into play new muscles) and of the resistance encountered by the limb. The precision is, moreover, the same for passive as for active movements.

Touching the influence of velocity, there is no agreement beyond the recognition of its importance. Loeb, Delabarre and others found that increased velocity brought about a marked decrease in the apparent length of the movement. Angier, however, reports consistent evidence to the contrary. But the investigations of Angier and of his predecessors were so narrowly limited with regard to the velocities, directions and extents of the movements studied as to preclude, in my opinion, any generalization. Moreover, their work was seriously deficient in exactness. In Loeb's experiments the subject was simply told to move faster or slower. Angier did better: he used a metronome.

The precondition of further progress is a method admitting of an

exact measurement of the time consumed by the movement. In my experiments I made use of a light apparatus carried by the index finger and so contrived that, in whatever direction the hand moved, the beginning of the movement makes an electrical contact. A break is caused by lifting the finger. The makes and the breaks are recorded on a kymograph drum below a time line. The results are as yet too fragmentary to warrant any conclusion.

A Measure of the Child's Visual Image and the Correlation of this with School Efficiency. FRANK G. BRUNER. (Read by title.)

The Psychology of Examinations. BROTHER CHRYSOSTOM. (Read by title.)

1. All successful teaching presupposes some kind of examination as a condition by which the teacher may gauge the rapidity of his exposition and the nature of his method; for, to quote St. Thomas, to teach is to produce science in the mind of another. From time to time, therefore, it becomes necessary to determine to what extent the pupil has assimilated the meat offered him by his preceptor, since education aims rather at power than at information.

2. When we compare the oral examination in circumstance and effect with the written test, we find it much inferior to the latter. Indeed, the written examination is psychologically defensible not merely on the ground that it revives memory and interest, but also because it demands the translation of one's thoughts into visual impressions through the medium of motor activity.

3. Moreover, any right use of examinations by the student involves a survey of the subject in which he is to be examined, at least in its broader relations to other subjects and in the relation of its parts to one another. This exercise of association or of apperception is a prominent factor in the development of mental power, and hence may throw light upon the workings of the youthful mind or upon one or more of its special gifts. This result may be greatly enhanced by returning corrected papers to him that he may not only see what is good and what defective therein, but also that he may reconstruct the subject in his own mind according to the standard set by these marks.

4. Furthermore there is often a great gain in giving him a choice of questions to be answered, provided, of course, that the questions may be fairly rated as of equal importance. Because it is a general rule that he will follow the lines of least resistance, we may safely infer that the questions unanswered are for the present beyond his grasp or, at least, outside his centers of interest. If this plan were consistently followed out in all his studies and the papers carefully

collated, it would be possible to draw up a good working map of his mind for the guidance of the teaching staff. This would be of great value in enabling the professor of any given subject to adapt himself to the level and the capacity of the individual student.

Visual Pressure Images ; Their Nature and Their Relation to the Visions Due to Mescal and Other Drugs. E. B. DELA-
BARRE. (Read by title.)

Pressure on the eye-ball produces a series of images, often very striking in form, motion and coloring. Most of them are of brief duration, rapidly giving place to others. Among the figures of most frequent occurrence are: irregular flashes or clouds of brilliant, delicate coloring; isolated spots of prismatic colors; mosaic arrangements of alternately colored squares, circles, or other forms; serpentine figures; six- or eight-rayed star patterns; zigzag, wavy or curved systems of delicate parallel lines; rapid streamings or surgings as of a boiling fluid, in circular, spiral or vortical motion; and others.

When carefully observed, these are probably not hallucinatory, but due to actual stimulations of the retina. Many of them can be definitely traced to known peculiarities of eye-structure. When not accurately observed, they would naturally be subject to varying degrees of hallucinatory interpretation, to whose content they would give, however, a recognizable tinge. Descriptions of visions observed under the influence of mescal seem to show that the visions are predominately due to this cause.

College Students' Ideas of God. JAMES H. LEUBA. (Read by title.)

A preliminary report upon nearly a thousand answers from college students to a syllabus. The questions were in almost every case during a regular class-hour. The intention was to gather information on students' ideas of God as they are before technical philosophical knowledge is brought to bear upon them.

Indications of Incipient Fatigue. WILL S. MONROE. (Read by title.)

Benjamin Rush, M. D., on Mental Diseases. I. WOODBRIDGE RILEY. (Read by title.)

Benjamin Rush (1745-1813), professor of the institutes of medicine in the University of Pennsylvania, has been called the father of American psychiatry; he was at least the first of the Philadelphia school of materialists to combine lectures on abnormal psychology and psychotherapeutics with a regular medical course. Rush early observed that the diseases of the brain should be narrowly watched,

since they often produce discoveries of the secret powers of the mind; like convulsions of the earth, which throw up metals and precious stones, that would otherwise have been unknown forever. In the essay on 'The Influence of Physical Causes upon the Moral Faculty' (1786), Rush calls the latter's partial action *micronomia*, its total absence *anomia*, and connects both these with the preternatural irritability of the nervous system. Here also the influence of association upon morals is strong, suicide being often propagated by the newspapers and monstrous crimes by the publication of court proceedings. The essay on 'The Influence of Physical Causes upon the Intellectual Faculties' (1799) holds that the enlargement and activity of the latter are as much within our power as the health and movements of our bodies. The lecture, 'On the Utility of a Knowledge of the Faculties and Operations of the Mind to a Physician' (1805), attempts a pathological explanation of the morbid phenomena of dreams, trances and phantasms and gives an authentic case of continuous secondary memory in successive somnambulisms. An earlier article on 'The Different Species of Pholia' (1786), defines the latter as a fear of an imaginary evil, or an undue fear of a real one, and leads to Rush's last and largest work, 'The Medical Inquiries and Observations upon the Diseases of the Mind' (1812). This presents a new nomenclature of mental diseases from *tristimania* to *manalgia*, suggests as a cure for *aboulia* Brissot's use of animal magnetism, and for insanity of doubt, the employment of positive assertions. In the chapter on derangements of the memory, there is an implicit recognition of the various forms of amnesia, as an oblivion of names and vocables, of the sound of words but not of the letters which compose them, of the qualities and numbers of the most familiar objects, of events, time and place. Rush's work concludes with a recognition of the moral imbecile, of the criminal insane, whose morbid operations of the will are to be considered not as vices, but as symptoms of a disease.

This paper is extracted from a chapter in a forthcoming history of 'Philosophy in America.'

Recent Tendencies in the Psychology of Values. W. M. URBAN.
(Read by title.)

(This paper has been published in full in the *PSYCHOLOGICAL BULLETIN*, 4, 65, 1907.)

PSYCHOLOGICAL LITERATURE.

EMOTION.

Pathologie du sourire. GEORGES DUMAS. *Revue Philosophique*, 1905, LIX., 580-595.

Dumas' hypothesis in regard to the origin of the smile developed in previous papers may be stated as follows: The smile is produced by any slight excitation of the facial nerve and can receive a purely mechanical explanation. The object of the present paper is to find support for this mechanical theory in pathology.

If the theory be true we ought to find, that (I.) all pathological causes which lessen the tonicity of the muscles of the face cause the expression opposite to the smile, *i. e.*, sadness, and that (II.) all pathological causes which increase the tonicity of the muscles tend to produce the smile.

I. In passive melancholia, the motor impulses are weaker than normally, the muscles are flabby, inelastic, and relaxed. As a result of this relaxed state of the muscles of the face, the expression is that characterized as sad; the nose is thinner and longer, the eyes half-closed, or open and dull, the eye-brows flattened, the corners of the mouth drawn down. Again in facial paralysis, in cases of hemiplegia, when the muscles of one side of the face are in a state of continued relaxation, the expression of this affected side presents the characteristics of sadness enumerated above. From these examples Dumas formulates the principle that all lesions of the facial nerve at any point, in the measure in which they cause a decrease of motor stimuli, and diminish the tonic action of the facial muscles, necessarily cause the expression of sadness.

II. In mania where the muscular tone is higher, the expression of the face is a constant smile.

Again in contractures of one side of the face, the expression of the side affected is as markedly a smile as in the cases of facial paralysis it was the opposite. The corner of the lip is lifted, the cheek rounded, the nostril extended. If the contracture is very intense, the stimulus affects other less mobile and antagonistic muscles to those involved in the smile and the resulting expression is nearer a grimace.

These examples support his conclusion that the smile is the easiest motor reaction to every slight stimulus of the facial nerve, whether the

stimulus be due to nervous or electrical energy, or to changes in circulation, or to inflammation.

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Le préjugé intellectualistic et le préjugé finaliste dans les théories d'expression. GEORGES DUMAS. *Revue Philosophique*, 1905, LX., 561-582.

In his former papers (*Rev. Philos.*, LVIII., 1-23; 136-151) the author reached the conclusion that the smile is the result of a slight stimulus just sufficient to produce the easiest reaction of the facial muscles by the coöperation of 15 of those that work together or, at least, do not oppose each other. He holds that similar explanations may be given for the motor expressions of the other emotions. In this paper he considers especially the expressions of the four fundamental emotions of joy, anger, grief, and fear, the first two being manifestations of hypertonicity, the last two of hypotonicity. An increase of the muscular tonicity greater than that of joy, explains the motor expressions of anger; while a diminution, almost a suppression, of the muscular tonicity, a lesser diminution of which explains the motor expressions of grief, accounts for those of fear. The author gives a biological description of the factors, peripheral and central, controlling muscular tonicity.

Dumas offers his explanation as against those given by Darwin, Spencer, and Wundt, who, he says, were prejudiced in their theories of expressions by what he calls the intellectualistic and finalistic tendencies. They were each, especially Spencer, in some measure aware of the mechanical laws of excitation and depression, but were unwilling to accept these as in themselves an adequate account of emotion expression. Dumas quotes some of the examples as explained under their principles by Darwin, Spencer, Wundt, and Mantegazza, points out the manifest puerility and faulty analysis, and shows how his own principles of hypertonus and hypotonus could be applied to the same instances.

Finally he thinks that further generalization should be possible that would explain, in like manner, the variations, during the emotional experience, in nutrition, in circulation and respiration, and finally in the intellectual states. Emotions then when looked upon as complex biological facts reveal the importance of the great laws of excitation and depression, which ought to be at the base of all study of their psychology. But though Dumas gives considerable confirmation of the importance, in the explanation of emotional expressions,

of these laws of hypertonus and hypotonus, he fails to give sufficient reason for his assumption of a conflict between these biological principles and what he calls the psychological explanations given by Darwin, Spencer and Wundt.

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THEORY OF TIME.

Ueber Lokalisation von Druckreizen der Hände bei verschiedenen Lagen der letzteren. HANS RUPP. Ztsch. f. Sinnesphysiol., 1906, XLI., 127-153.

The writer gives the results of an investigation into the problem concerning the relation of the times necessary for locating, with eyes closed, tactile stimulations on different parts of the hand. Or more specifically, what is the relation of the reaction times necessary in naming the hand or finger on which the touch is experienced in case the hand is found in different locations?

A Hipp chronoscope was used in connection with a Kraepelin electric pen which released the current and a lip-key which closed it when the name of the hand or finger affected was pronounced.

The trials were made with the hands in different positions, thumbs above, below, hands crossed, fingers crossed, also with hands behind the back.

Tables of results are given. These show that it cannot be laid down as a law that it takes longer to name the fingers stimulated when crossed than when held parallel. But in naming the hand more time is required when fingers are crossed than when they are parallel. Naming the hand requires a longer time when hands are crossed. Naming the fingers with thumbs down requires more time than with thumbs up, whether hands be crossed or not. Where hands and fingers both are crossed the time is lengthened. The results gained in regard to simple reaction to stimulation of hands and fingers in various positions were not decisive. The experiments suggest an interesting field for further work.

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C. B. McMULLEN.

DIZZINESS.

Beitrag zur Lehre von den Funktionen der Bogengänge. ROBERT BÁRÁNY. Zeitschr. für Sinnesphysiol., 1906, XLI., 37-44.

According to the older view of the functions of the semi-circular canals it was held that when the body is rotated about its vertical axis the displacement of the endolymph stimulates the vestibular nerve

endings and gives rise to sensations of rotation. These rotation sensations in turn occasion those movements of the eyes known as nystagmus. The more recent view, as expressed by Nagel in the *Handbuch der Physiologie*, is that the nystagmus is a reflex directly coördinated with, and not caused by, the sensations of rotation. Bárány, in this article, reverses the relationship and furnishes experimental evidence to show that the sensations of rotation are, at least in part, caused by the nystagmus movements, since in certain cases where there is no nystagmus the sensations of apparent rotation are also lacking.

After rotation to the right has ceased a horizontal nystagmus is observed, the slow phase of which is to the right. "When the eyes are open, therefore, objects in the visual field appear to be moving to the left, and with closed eyes the subject's own body appears to be rotating to the left. Bárány finds that by directing the gaze strongly to the right the nystagmus may be inhibited, and along with it the sensations of moving objects or of the rotation of the body disappear. If the gaze is now directed to the left the nystagmus reappears and the sensations of apparent rotation return. In like manner disturbances of equilibrium are found to be associated with nystagmus, and are inhibited with inhibition of the nystagmus. The sensations of eye-movement, then, would seem to be the chief cause of the apparent rotation and of the disturbances of equilibrium, and the function of the semicircular canals would be confined to calling forth the reflex slow phase of the nystagmus. The presence and degree of nausea in rotation dizziness varies with individuals, and is probably due to a direct connection of the semicircular canals with the nerves of the alimentary canal through the nuclei of the medulla.

A clearer and more lucid analysis of the phases of nystagmus and their control is given by Holt ('Vision during Dizziness,' *Harvard Psychol. Studies*, 1906, II., 67-73), who reaches practically the same conclusions as Bárány.

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ÆSTHETICS.

The Essentials of Æsthetics in Music, Poetry, Painting, Sculpture and Architecture. GEORGE LANSING RAYMOND. New York, G. P. Putnam's Sons, 1906. Pp. xix + 404.

The general position maintained by the author in this book is that art is nature made human. "Art of the highest and finest quality," he says, "involves three things: First, a reproduction of the phenomena of nature, especially its sights and sounds; second, an expres-

sion of the thoughts and emotions of the artist; and, third, an embodiment of both these other features in an external product like a symphony, a poem, a painting, a statue, a building." Beauty is defined as 'a characteristic of any complex form of varied elements producing apprehensible unity (*i. e.*, harmony or likeness) of effects upon the motive organs of sensation in the ear or eye, or upon the emotive sources of imagination in the mind; or upon both the one and the other.'

The artistic impulse is identified with the play impulse, and is differentiated from the religious and scientific consciousness by reason of the fact that it involves both subconscious inspiration — by which the author seems to mean intuitive mental action — and conscious investigation and observation; whereas the religious consciousness involves dominantly the former, and the scientific consciousness the latter. Art, then, 'is a development of the earliest endeavor of men to give form to thought for which they have no form at their command.' The artistic temperament is quick to apprehend the effects of nature, to seize upon and represent them in a significant fashion. Art is not a means of communication, but of representation. Since the 'art-impulse' is attributed to the 'life-force' issuing from the subconscious or spiritual nature of man, it follows that this personal note dominates his product; and the product will be successful in the degree in which it represents the artist's surroundings in such ways as to manifest his own personality, his individual thoughts and emotions. This renders his work distinctive, but not less universal for that, since he derives his concepts direct from nature.

According to the three normal impulses: religious, scientific and artistic, there are three sorts of art: idealistic, realistic and idealized realistic. The first emphasizes the good, may be characterized as sublime, grand, or horrible, and finds its adequate expression in the epic form. The second emphasizes the true, may be characterized as picturesque, simple, or pathetic, and finds its adequate expression in the realistic form. The third emphasizes the beautiful, may be characterized as brilliant, striking, or violent, and finds its adequate expression in the dramatic form. An art-product which is neither distinctly epic, realistic nor dramatic is lacking in definiteness of effect, and usually felt to be inartistic. The argument here is rather dogmatic and not thoroughly convincing.

In discussing the elements of form, the author considers first the influence and significance of duration, pitch, intensity and quality in the arts of sound; then, in the arts of sight, he attempts, by analogous

treatment, to show the relation of size or extension, shape or outline, solidity and temperature respectively to each of the first mentioned elements. The general conclusion is that 'certain audible or visible effects traceable to material or to human nature have, either by way of comparison, as in imitation, or of association, as in conventional usage, a recognized meaning.' It is not quite clear, however, what has been gained by coupling the relative significance of the four attributes of sound as applied to music and poetry with four more or less arbitrarily selected attributes of vision as applied to painting, sculpture and architecture.

The methods of art-composition are said to result, as applied to duration, in rhythm; as applied to extension, in proportion; as applied to quality and pitch of note and color, in harmony. All three, rhythm, proportion and harmony, are the result of grouping together effects of sound or sight that are alike, or multiples of others that are alike. Since all consciousness is due to vibrations of the nerves in the brain, the inference is that harmonious vibrations of the ether produce harmonious effects on the brain, allowing always for the change in medium which causes us to interpret things somewhat at variance with their actual external nature, and makes the effect rather than the cause the important factor.

In the application of this general theory a point or two may be worth noting. First, with respect to form as visual outline, it is concluded that the upright elliptical figure, or 'elliptic lanceolate,' is that form which requires the least visual activity, work, or effort to recognize it, and is therefore the one most conformed to the physiological requirements of the eye. The basis of this contention is that the fields of vision of the two eyes, each field taken to be circular, overlap to form a combined field, only the central portion of which, in the shape of an upright ellipse, is common to both eyes. The error in reasoning seems to be revealed when we consider that the fields of vision of the two eyes taken separately are horizontal ellipses rather than circles. The field of vision common to both eyes is, therefore, more nearly a circle than an 'elliptic lanceolate.' It is difficult to understand why lines which would coincide with, or run parallel to the limits of this field should be more easily apprehended than are any others. We must, therefore, conclude the author's point that the 'absence of like curves' such as are described in the 'elliptic lanceolate' makes for unæsthetic effects to be not convincing.

Another point is made in tracing the analogous effects of harmony in sound and color. The author's main thesis with regard to music

seems to be that harmonic relations are built on the basis of notes whose overtones are the most alike. Thus the relation of C to F is found to be the closest. This relation is numerically expressed as 3:4. Now, in the color scale the vibration rates, as given, extend from 392 to 757 'trillions' (the author of course means *billions*, though he uses *trillions* consistently throughout his book). This scale is conceived as analogous to the musical octave with the upper note omitted, *i. e.*, C to B inclusive. The author then finds that by applying the ratio 3:4 he can produce the most harmonious color combinations. This constitutes a very pretty analogy, if the facts bear him out; but even so it is not quite clear what advantage is gained in such an explanation of æsthetic effectiveness. Facility of physiological functioning doubtless plays a part in determining elementary æsthetic effects, but in view of our meager knowledge of the physiological mechanism of the eye and ear, it appears rather futile to juggle overmuch with seeming analogies of vibration rates. In the case of musical theory, there are many reasons why certain simple ratios should, in the history of the race, have attained a significance and ease of functioning. It is not quite so evident that analogous conditions should obtain within the narrower scale of visual stimulation, nor, in case they do, just in what sense the real problem has been clarified.

As a whole, the work lacks those psychological foundations which many of us consider desirable in a treatise on æsthetics. As a result, the subject matter is more that of art theory than of æsthetics in any broad sense. Yet the pervading tone is one of sanity and tolerance which will commend the book to many. Although we cannot, perhaps, agree entirely with the author's own estimate of his work, we can, at least, conclude our review by quoting it:

"It is gratifying to the author to be able thus in closing to point out that the conception of art and of its mission presented in this volume is one—and, probably, the only one—which can logically be made to harmonize with all those conceptions of right thinking and right living which, when applied to practice, have proved to be the most effective in promoting human welfare."

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DREAMS.

Le Reve. MARCEL FOUCAULT. Pp. 304. Paris, Alcan, 1906.

M. Foucault formulates his own theory of dreams, at the same time paying due regard to the discoveries and theories of other investigators. He illustrates the various points in his analysis by more

than a hundred new observations of dreams, some his own, and the remainder in most cases recorded by the persons who dreamed them. At the end, in a few pages of 'Conclusions,' he so admirably sums up the gist of the whole discussion, that the book could almost be reviewed from these alone.

The study of dreams involves two problems: first, how the memory of the dream is formed from the dream; and second, how the dream itself is formed. Foucault shows that in the memory of the dream logical transformations and supplementations play a large part. In particular he shows that in dreams which are complex, *i. e.*, which contain more than a single 'tableau' or incident, the actual dream at the beginning of the waking process is composed of several disconnected incidents or situations; that these are connected in serial order during the waking process, or afterwards; and that various elisions, additions, and alterations are effected in order to make the series coherent. This is finely illustrated by the observations, particularly those in which the recording was repeated, one record being made immediately on waking, the other some time later.

The principal cause of the dream itself is the proper force or spontaneity of images, by which they tend to return to consciousness and develop. Of this feature Foucault thinks not enough has been made heretofore. The force of the tendency for the image to reappear is determined by its habitual appearance, and its recency, or that of the perception from which it is drawn, as well as by its emotional associations. The attention given to the perceptions or images is of prime importance in governing the reappearance: those which were *least* attended to being most apt to recur. Foucault distinguishes, however, between ideas which hold the attention spontaneously and those which are held voluntarily, and admits that an image that is voluntarily attended to *may* return, though its liability to do so is relatively small.

The 'development' of an image is the calling up of other images to form a series with it. This proceeds through the above mentioned intrinsic force of the image, and is aided and controlled by conations, and, in perceptual and organic dreams, by peripheral stimulations which operate selectively on the imaginative material at the disposal of the developing series. In the realization of desired or abhorred conclusions in this way, the effect of attention is again seen, since the ones so realized are usually those which are not seriously expected in real life.

The incoherence of the complex dream before it has undergone

the logical operations succeeding sleep is due to the fact that in the sleeper's mind there are several of these series developing simultaneously and independently, the last portions of which are grasped as he wakes, the series being subconscious up to that moment. In the author's words, "the sleeping mind writes several books at the same time, but without knowing what it does. When it awakes it reads what it has written, but it reads the last pages of each of these books. Imagining that it must have written something rational it seeks to understand them by putting them together."

Many observations are cited in support of this theory, points being made on direct introspective confirmation, variability of time order of events in dreams, presence of more than one incident interrupted by waking, apparent repetition of an incident, and contradiction of incidents. This discussion remains, however, the least convincing portion of the treatise.

All sleep is dreamful, according to Foucault, and his observations seem to show that immediate introspection at any sudden waking will find dream images, which are forgotten with facility. He holds, moreover, to the doctrine that adaptative reactions indicate the presence of consciousness in the sleeper.

Many other interesting details are developed in the course of the treatise, and will well repay reading. The volume closes with the expression of M. Foucault's belief that the study of dreams will prove a very important means of probing into the subconscious.

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IDEALISM.

Experience and Objective Idealism. JOHN DEWEY. Philosophical Review, 1906, XV., 465-481.

Objective idealism in its recoil from sensationalism, in its effort to favor an absolute, external experience, while disowning the validity of experience here and now is forced into a quandary the only escape from which is to be found in the adoption of a complete functional empiricism.

Three important conceptions of the relation of reason to experience stand out in the history of idealism. In Greek philosophy the relation was one of sharp antagonism. By experience was meant activity, more or less skillful and habitual, the result of repeated effort, not based on any well-defined or consciously worked out technique. Hence it is connected always with *becoming*, not with being, and is

so subjected to this perpetual condition of change that it furnishes but an inadequate imitation of reality. Permanent and assured being is to be found only in the realm of ideality. Reason as the embodiment of significance is the source and guardian of the true, the beautiful and the good.

With the appearance of innate ideas and pure concepts the conflict between rationalism and empiricism was renewed. Experience, observation, according to the rationalist supplies but the data for thinking. It is the element that controls thought from without. This external material must be submitted to the qualifying transformation of conception before it can attain to the dignity of scientific knowledge.

As the outcome of Kant's revolt against subjectivism, which reduced experience to chance associations of sensations and ideas, the function of reason is further elevated. Thought no longer merely deals with perceptual data impressing it from without, it *constitutes* these data as objective, relates and organizes them.

These three conceptions of the relation of thought to experience suggest as many problems. In the first place, in what sense does thought as a *priori* constitute the objectivity of experience? Kantian idealism wavers continually between a point of view which reduces thinking to an empirical fact, an immanent function, a method of synthesis, experience's inherent mode of organization and one which exalts it to the position of a transcendental power determining in advance the character of experience. If Kant had held consistently to the first of these positions his reply to Hume would have resulted in the formulation not of an objective idealism but of a revised empiricism.

Further, the fact of attained organization in experience must be traced to habit rather than to thought, and about such organization there is nothing inherently sacred. Reason, itself a biological function, serves to evaluate organizations already existent, instincts, customs, habitual practical activities, social institutions. The concept is in fact nothing but these various activities brought to consciousness and so controlled and redirected. Thought is of service only in putting things in the way of helping themselves. Habits and institutions are always to be recognized as *tools*, to be employed for the sake of getting the fullest, freest activity possible and to be abandoned at the point where they limit that activity.

The second problem has to do with the relation of conception to perception. The error of idealism here is that of confusing observation as found in science with the nature of perception in a concrete, non-scientific experience. The distinction between inference and ob-

servation in scientific reasoning is a deliberate methodological one. In scientific observation there is a persistent conscious attempt to escape meaning, to get at the bare facts in order that a more permanent and assured meaning may be obtained. In failing to see the purely instrumental character of this distinction Locke furthered the conception of thought as supplying a necessary element to mere brute description. Perception not of the scientific, analytic type is an activity in which we have the adjustment of an organism to its environment with discrimination and mutual reference of objective conditions. In experiences of this kind it is impossible to make the separation between observation and thought, since perception arising out of a concrete need, seeking a definite purpose, comes weighted with incalculable ideal, emotional and æsthetic values.

The third mistake of objective idealism is that of supposing ideals to be eternally and absolutely *given*. It is rather the *non-givenness* of an ideal value which makes it ideal, something more, that is, than purely natural. The objective idealist must either agree to the complete embodiment of this fixed law of goodness in experience past, present and to come, an agreement committing him to a mechanical theory, or he must accept it as so separated from experience as to be absolutely ineffective. Experience from the side of memory supplies principles of action true enough to afford a satisfactory working basis for the future. An ideal is an anticipated value formulated on the basis of past activity. It is relative, transitory, but its thoroughly empirical nature detracts not at all from its 'grace and severity' as an ideal. Normative values are not given once and for all but are found within experience in continual process of change and development. The function of intelligence is the control of this changing meaning of experience for the attainment of those ideals which are at one and the same time most flexible and most worthwhile.

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WEIGHT SENSATIONS.

Beiträge zur Psychodynamik der Gewichtsempfindungen. ALFRED LEHMANN. Arch. für die ges. Psychol., 1905, VI., 425-499.

It was the original intention of the author to incorporate the material of this article in his *Elemente der Psychodynamik* which appeared in 1905 as the third part of the *Körperliche Ausserungen psychischer Zustände*. In order not to delay the publication of that work, however, the discussion of weight sensations was omitted and is published here. This was unfortunate, since the article as it stands is

anything but clear and luminous to one who has not mastered the contents of the *Elemente*. The latter work is without doubt a valuable contribution to the literature of psychophysics, and supplements in a highly ingenious manner the efforts of Fechner and G. E. Müller to obtain by elaborate mathematical calculations and equations an exact expression for the relations between mental and physical phenomena. Whether the results obtained from the attempt to express the variable and complicated processes of mental life in the exact terms of mathematical formulæ repay the time and effort expended—whether a simpler and more direct statement of the outcome of experimental investigation would not further the advancement of psychological science better than such involved mathematical formulation, is an open question. The doubts expressed by Külpe, in a criticism of the second part of the *Körperliche Aeusserungen psychischer Zustände*, as to the relative value of this mass of mathematical ‘speculations, evolutions and equations, in which a whole army of postulates, simplifications and combinations are involved,’ also apply to the *Elemente der Psychodynamik*, and *a fortiori* to the present article. The *Elemente*, however, is a work of great interest even to the non-mathematical psychologist, in view of the fact that here we have the first consistent attempt, to my knowledge, to carry through the important physiological concepts of inhibition (Hemmung) and reinforcement (Bahnung), and to show their influence throughout the whole range of psychophysiological processes. The conception of reinforcement as the cause of association is one which is bound to attract attention.

The present article is an attempt to show that the law of reinforcement, as developed in the *Elemente*, and the equations which represent its mathematical statement as applied to sound sensations are also true of weight sensations. Further, the ‘negative time error’ and other ‘errors’ of Fechner and Müller are to be explained as due to the law of reinforcement. Throughout the article this law of reinforcement is repeatedly referred to, but nowhere are we told what it is. Referring to the *Elemente*, however, we find the following statement of it on page 46: “If a sensation produced by a stimulus R reinforces a succeeding sensation produced by a stimulus r , the intensity of the latter sensation will be increased just as if the stimulus r had received an increase uR^v , where u and v are functions of the time interval between the two stimuli.” From mathematical statements of the relationships involved in this law there are developed by complicated mathematical combinations sixteen different equations to express the relations of stimulus to sensation in lifted weights. Experiments were

carried on for eighteen months with weights from 150 to 5,000 grams and the tabulated results are compared with results calculated by aid of the formulæ. These two classes of results show an agreement which, while not exact, is at least satisfactory to the author.

Two interesting points come out in the interpretation of the experimental results. The standard weight was always lifted first. With the heavier standards the second weight, subjectively equal to the first, was uniformly lighter objectively, *i. e.*, showed a negative time error, which is explained by the law of reinforcement. But the lighter standards showed a positive time error. This is accounted for on the assumption that the reinforcement is very slight for light weights, but lifting the first weight acts as an adjustment for the motor innervation in lifting the second; hence the second seems lighter and requires more weight than the first to establish subjective equality. If the standard be lifted twice with pauses of four seconds between, and then compared with the second, the innervation is adjusted before the comparison is made, and there results a slight negative time error such as might be expected from the slight reinforcement.

When weights are lifted slowly, as in this investigation, the chief factor in their estimation is undoubtedly the sensation of strain. But sensations of pressure also enter in. The standard 1,500 gram weight was provided with a rough pasteboard handle. For the compared weight a box with a smooth handle was at one time used. Instead of the negative error a positive error of 365 grams resulted. With the same kind of handle on both weights the usual negative error of 100 grams was obtained. A similar difference was observed with other standards. Weight experiments, therefore, involving different kinds of contact surface are quite incomparable.

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La Physionomie humaine, son mécanisme et son rôle social.

I. NAGNBAUM. Paris, Alcan, 1907. Pp. 320. Fr. 5.

On the Functions of the Cerebrum: the Frontal Lobes. S. I.

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- The Roots of Reality, being Suggestions for a Philosophical Reconstruction.* E. BELFORD BAX. London, Richards, 1907. Pp. 10 + 331. 7/6 net.
- Remarques sur la Monadologie.* J. PAUL MILLIET. Paris, Jacques, 1907. Pp. 80.
- Les Bases de la Philosophie Naturaliste.* ANDRÉ CRESSON. Paris, Alcan, 1907. Pp. iii + 180. 2 fr. 50.
- L'Année Philosophique (dix-septième année 1906) Publiée sous la direction de F. PILLON.* Paris, Alcan, 1907. Pp. 272. 5 fr.
- The Major Symptoms of Hysteria.* PIERRE JANET, M.D. New York, Macmillan, 1907. Pp. x + 346. \$1.75.
- Lectures on Humanism.* J. S. MACKENZIE. New York, Macmillan, 1907. Pp. vi + 244. \$1.25.
- Twenty-fourth Annual Report of the Bureau of American Ethnology.* 1907, Washington. Pp. xl + 846.
- Tariffs, Reciprocity and Foreign Trade.* The Annals of the American Academy of Political and Social Science. Philadelphia, May, 1907. Pp. 226. \$1.
- Report of the Commissioner of Education for the year ending June 30, 1905.* Volume I. Washington, 1907. Pp. li + 655.
- Naturwissenschaft und Weltanschauung. Vortrag gehalten auf der 78 Versammlung deutscher Naturforscher und Ärzte in Stuttgart von THEODOR LIPPS.* Heidelberg, Winter, 1906. Pp. 40.
- Psychology: General Introduction.* CHARLES HUBBARD JUDD. New York, Scribners, 1907. Pp. xii + 390.
- Laboratory Manual of Psychology.* CHARLES HUBBARD JUDD, New York, Scribners, 1907. Pp. xii + 128.
- L'Orientazione Psicologica dell' Etica e della Filosofia del Diritto.* PROF. ALESSANDRO BONUCCI. Perugia, Bartelli, 1907. Pp. 384. L. 7.50.

NOTES AND NEWS.

Prof. Pierre Janet's lectures at Harvard on Hysteria are to be published at once by The Macmillan Co., with the title *Major Symptoms of Hysteria*.

Dr. W. C. Ruediger has been appointed Asst. Professor of Educational Psychology in the George Washington University.

Dr. J. Carleton Bell, Instructor in Experimental Psychology, Wellesley College, has been appointed to take charge of the new psychological laboratory in the Brooklyn Training School for Teachers.

At a recent meeting of the Board of Trustees of the University of Illinois, the following promotions and additions were made in the department of psychology:

Dr. Stephen S. Colvin, Associate Professor, to be Professor.

Dr. John W. Baird, Instructor, to be Assistant Professor.

Dr. Fred. Kuhlmann, Assistant in Psychology at Clark University, to be Instructor.

The department has grown rapidly in numbers in the last few years.

It will be given new and ample quarters in the addition to the Natural History Building which will probably be open for use in September, 1908.

THE
PSYCHOLOGICAL BULLETIN

AN ATTEMPT TO HARMONIZE THE CURRENT PSYCHOLOGICAL THEORIES OF THE JUDGMENT.¹

BY PROFESSOR W. B. PILLSBURY,

University of Michigan.

Leaving aside for the moment the judgment of formal logic and all considerations of language, we may say that there are four apparently widely divergent uses of the word judgment in popular speech and in well recognized theories. These are, first, the theory of Brentano that judgment is belief, a process that must be gone through with for each sensation or idea that comes to consciousness whether the result be positive or negative. Brentano, it will be remembered, assigned no laws to belief nor made any attempt to analyze it. The second, widely prevalent in popular usage and given psychological vogue recently by Marbe, is that judgment is comparison. A third even more general popular usage, made fundamental for theory by Meinong, Ehrenfels and recently adopted for the emotions by Ribot, is that judgment is a process of evaluation, or the process of assigning anything its place in a scale of values. The fourth, the familiar definition of modern logic, is that it has to do with the process of ascription of meaning to the given.

In formulation, at least, there seems nothing in common between the different definitions, and it seems worth while to examine them objectively in an endeavor to discover what there is of identity between them. For psychological purposes there is more immediate evidence of resemblance between the last three, so we may consider them first, and proceed at once to a psychological examination of each.

The process of comparison is one that close observation shows to be very different from what it is ordinarily supposed to be from a

Read before the American Psychological Association, December, 1906.

priori considerations. Theoretically and logically the process would seem to be one of a definite consciousness of two separate elements successively, and a weighing of one against the other until their relations are assured. As a matter of fact, however, what happens is merely that one is conscious of the two elements, and from that attentive consciousness the comparison results without any intermediate steps. The weighing is never in evidence. Even in cases of doubt where there is delay, all that can be discerned is that attention turns first to one then the other and alternates between the two terms until suddenly the doubt is resolved; the word heavier, brighter, louder or what not enters the mind, or if one is not to speak, some other symbolic imagery appears, and the comparison is complete. In all of Marbe's experiments there was never a sign of anything intervening between the perception and the completed judgment. One antecedent element that is always present, and essential, is that there be a purpose of comparing or a question of relation in mind before the objects are experienced or before the perception is completed. Under the influence of this question the two are experienced as one, and the comparison is completed.

Even more striking are the results of comparison when a considerable interval intervenes between the two experiences to be compared. Then, too, all that is necessary is to have in mind the question, Is this color brighter than the one I saw yesterday? and without any recall of yesterday's color the comparison is made. In neither case apparently is the consciousness of the comparison or its conscious antecedents much different from an ordinary instance of perception. There, too, we see what corresponds to the mood or purpose of the moment. If we have been asked, Is that object red? we notice the color; if, as we look at a landscape, we are interested in water for any reason, that at once leaps from the scene as we look. The result of comparison seems just as immediate and just as simple a result of the attentive regard as is the color or the lake in the universally accepted instance of perception. When two objects directly presented to consciousness are looked at with the appropriate problem in mind, brighter, larger, right or left, before or after, are just as much simple aspects of the situations as are gray or round, house or tree. The two terms are but parts of a larger whole, and the essential element in the process depends upon the unity of the whole rather than upon the pdulicity of the terms.

The next form of judgment, evaluation, is more closely connected with the former than might appear; in fact, it becomes but a sub-form of the first if we remember that evaluation is comparison of the object

to be evaluated with a norm, or preformed standard of value. That this comparison is not altogether different from the other is evident from two facts in connection with comparisons over long intervals of time: the one, just mentioned, that the first term is frequently not definitely conscious at the moment of comparing, and the second, a fact noted by Lehmann and recently by Hayden, that the comparison is usually not directly between the terms, but each is compared with an antecedently developed scale of standards. Lehmann in his classic experiment found that grays were recognized in terms of words in ordinary use that had a definite denotation for the observer. For Hayden in his comparisons of weights, the individuals were compared with a standard, but for his people the standard was visual rather than verbal. In Hayden's experiments and Lehmann's later ones, the standard developed in the course of the experiments; it was not given in advance. The tendency for standards to develop and for the individual elements to gravitate toward them is perhaps an explanation of Bentley's result that all of his colors shown in daylight tended to become brighter in memory, and for all those shown in the dark to darken. Here also we might find an explanation for Flournoy's results that the digits in memory tend toward the means, and away from extremes. There seems first a tendency for standards to develop from many discrete experiences and then for the individual experiences to tend toward the standards and be replaced by them in memory. If we turn to the application of valuation in the affairs of everyday life we have the basis of the methods of evaluation. When we judge a painting, we are giving it a place in our preformed scale. It is good, bad or indifferent with reference to other pictures we have seen, or with our standards that have gradually crystallized from the different examples of art that we have seen. We judge a man as good or bad according as he measures up to some one or other of our standards in the respect under consideration.

Ordinarily here, again, the first term in the comparison is not definitely in consciousness as the comparison is made; in many cases even the standards or scales have never been pictured in any definite form but the result of the comparison is none the less positive for all that. The standards, too, as in the experimental comparisons, gradually precipitate from many experiences, but when developed serve as more or less conscious elements in the evaluation of all other experiences. Evaluation is like comparison too, in that the particular evaluation made at any moment depends upon the problem in mind or upon the mental context. A man is adjudged now on the basis of scholarship, again for athletic prowess, good fellowship or morals. Which judgment is passed depends altogether upon circumstances of the moment,

as does the comparison or simple perception. If you are concerned in a business deal, an object is measured by its supposed monetary value; if in a scientific study, other standards are used and other judgments are passed, although the words used may be identical in each case.

Again, the only conscious part of the evaluation is the completed decision. There is nowhere consciousness of the standard; there is no weighing that intervenes; the purpose is in mind, the object or stimulus is presented, and its rank is assigned without any further thought or consideration. The thing is beautiful or ugly, good or bad, adequate or inadequate, and so far as we can observe at the moment, that is the beginning and end of the conscious process. There is no thought at the time of the innumerable experiences from which the standard has been precipitated, or of the standard itself, nor always of the mental context or mood that gives the final impetus to the process.

Judgment as ascription of meaning is but the next grade removed from evaluation. If we dare to ascribe concrete psychological body to meaning at all, we must define it as the standardized or harmonized experience. And we pass to this at once as we perceive or think of any object or thing. When we see an object across the room we see it not as the size it is upon the retina, but we see it of the size that it would have at the distance we have set for ourselves as its normal distance, a distance and size that have grown through use to be the standards of reference. And in every other imaginable perception we find that there is reference to standards of this kind. The thing never for a moment stands alone, but is always taken up into and given a position by a mass of previously organized experience. This organized system of knowledge not merely takes over the newly entering, but actually replaces it to such a degree that the standard or meaning alone comes to consciousness.

In other respects too the process of ascription of meaning is like the two earlier processes. It depends upon the mental context or situation which of the many possible meanings shall come out at any moment. A pebble is now an evidence of the glacial epoch, now a missile, again a complex of chemical compounds. Which of these and many other things it shall be at any moment is dependent entirely upon the situation in which the observer is placed, and upon his mood as he looks. As we have seen above, too, the meaning attaches at once and is itself the only conscious evidence of the accumulated experiences that are active in its production, or even of the stimulus that excited the process. Like evaluation and remote comparisons, it depends upon standards and scales, or at least schemata that have devel-

oped in earlier experience, and are aroused with the new process. In fact, so much alike are the three processes that it would be easy to say that comparison is but the ascription of one meaning, evaluation of another meaning. The difference lies merely in the fact that in comparison the meaning is ascribed to a whole in which two parts are distinct, while in evaluation and the ordinary judgments of perception there is but a single object. But when we remember that an object may be of any degree of complexity and still be regarded for the moment as a single object, and that what is now said to be single may be regarded as two or more objects at the next instant, the difference is not so great as to make the two processes altogether distinct.

There is nothing more mysterious about the comparison than about simple perception, in fact it may hardly be said to be more complex. If you are looking at a mass of presented material with the question heavier or lighter, the resulting process is comparison, just as when you look to determine the color the resultant process is green, or when you look at a rug with a view to purchase you conclude that it is beautiful and worth the price. These three operations, which have at different times been designated by the word judgment, are closely related and from the most essential points of view may be regarded as one, provided that one be ascription of meaning in a fairly broad use of the term.

Brentano's definition that judgment is a process of affirming or denying belief is related to the other group superficially in that it has to do with but a single term. It is different from them superficially, in that it apparently deals with a new process that is alleged to intervene between the entrance of the sensation and its full acceptance into the mental states. Observation does not seem to confirm this intervening state of the bare sensation unbelieved and undenied. Rather may we assert with Bain that every process that enters consciousness is at once believed and that the very conditions of its entrance are at the same time the conditions of belief. We may perhaps go farther and assert, for there is no time to prove, that the mood and the crystallized experience that together impel to the ascription of meaning and constitute the meaning, are at the same time the elements that determine belief. If there is but one meaning that can be attached at any moment, and that meaning does not conflict with any of the earlier developed schema, then we have belief. Whenever, however, the situation, mental and physical, makes either one of two meanings possible, or there is conflict between the most evident interpretation and the earlier schemata, then comes doubt or if the conflict be too great positive disbelief. If we accept this view, then we would have belief not the end of judging,

to be sure, but an invariable concomitant of the processes that are involved in judging in the trio of definitions discussed above. While Brentano's definition can not be said to apply to the same process as the others, still he indicates as essential a valuable by-product of the ascription of meaning.

The most recent definition, as formulated by Miss Thompson and other students of Professor Dewey, presumably by Professor Dewey himself, comes very easily under the first category, with one slight exception. Judgment is defined as the ascription of meaning, and is made to grow out of the situation. The only departure is that apparently doubt or conflict is regarded as essential to the process. This reduces again in terms of meaning to the possibility of attaching two meanings rather than one to the object that is entering consciousness, that the mood or the external situation is such that the two interpretations strive for the mastery for a time before one wins and the corresponding meaning is attached. The difference is largely one of the application of terms. Everyone must admit that the instants of doubt unresolved are those in which consciousness is most complete and full, but whether the term judgment should be restricted to these conditions and not be used also to describe cases in which the same end is attained without the by-product of doubt, is a question. The meaning attaches just as surely, the final result is just as true, in many instances in which doubt is absent and the meaning attaches at once as in those where two meanings struggle for the mastery. It seems to the writer that if the criterion of judgment be effectiveness, or if it be the nature of the situation objective or subjective, then the broad application is the better one; if it be a matter of the emotional accompaniment of the process, then the narrower alone would be possible. Historically and in popular usage, too, the broader use has the advantage of greater currency.

The differences, however, are in minor points. In the broad outlines there is agreement between all five of the definitions considered. In some form or other judgment is the process that an impression undergoes as it enters consciousness, and this interpretation is always due to the attachment of meaning. How important the belief attitude may be that arises in connection with the process is not as yet matter of absolute agreement, but that is after all a minor matter in comparison with the other.

The question as to how this psychological process finds expression in language is by no means agreed upon, but fortunately that is not a matter that we must face in this connection.

METHODS OF INVESTIGATING THE PROBLEM OF JUDGMENT.

BY PROFESSOR WILMON H. SHELDON,

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That there is a considerable harmony between our various psychological theories of judgment, Professor Pillsbury has shown in the preceding paper. That also there is a certain amount of agreement between the various logical theories, and even between the logical and psychological theories, is perhaps susceptible of proof. And we regard it as a valuable and indispensable contribution, when one thus shows up certain points of doctrine which have received general assent. Corresponding to this, a complementary contribution is needed, bearing upon the differences in the theory of judgment. For while there is undoubtedly much agreement about the general nature of judgment, yet when we come to questions of detail and especially to the methods of investigating those questions, there is much difference of opinion. For example: Brentano, Marty and others have said that judgment need have no complexity of content, while Erdmann, Wundt, Sigwart and others insist on a certain amount of complexity, as much namely as lies in the subject-predicate structure. Again Wundt maintains that the judgment consists in our marking articulate (*Zerlegung*, *Gliederung*) a total idea; Sigwart¹ declares that this articulation is but a preceding condition of judgment while the judgment itself arises only when we unite the articulated parts. As to the impersonal judgment, Wundt, Sigwart, Lotze, Ueberweg and others ascribe to it a subject: Brentano, Miklosich, Marty, MacLennan, deny a subject. As to the nature of the subject-predicate relation, we have the *Ver-schmelzung* of Herbart, the old subsumption-view, the stimulus-response view of Dewey, the feeling of *necessary* union of Sigwart, the identity-relation of Natorp, the 'absolute connection' of Bosanquet,² the logical immanence of Erdmann, the 'negative relation' of Schrader. No doubt a certain harmony exists between all of these differences, but the disagreement is certainly more striking than the agreement. Now it is generally true that differences in result are due either to defective method or to thoroughgoing difference of method. And

¹ *Viertelj. f. wiss. Philos.*, IV., p. 460.

² *Knowledge and Reality*, p. 170.

the literature of our problem shows this to be the case here. The methods are defective in that none of them gives, in questions of detail, very much that is indubitable empirical fact. Perhaps this is nobody's fault; perhaps such indubitable fact is almost unattainable in this region: at any rate introspection seems almost powerless to throw any light on questions like the above; and other methods, as we shall see, have special pitfalls of their own. As to the differences of method, we see in the literature of the subject a conflict seemingly irreconcilable. Thus, Jerusalem and others¹ believe that the matter ought to be studied as a psychological problem; Husserl, Schuppe,² and the majority of logicians believe it to be a conceptual affair essentially; Erdmann³ believes that the linguistic expression of judgment has important bearing on the logic and psychology of judgment while Royce⁴ seems to deny this. Now is it surprising, in view of the defect of our methods (call it the excessive difficulty of the problem if you like) and the hostility between the various methods, that our results disagree? And so it seems to me desirable to attempt a contribution complementary to that of the preceding paper; to give some account of the different methods. Many will think that we have had too much discussion of method and too few positive results; yet results are so desperately hard to get, that we need every means of getting them we can carry. We need to have in mind a fairly complete summary of all the methods known, to have as exact as possible a definition of each, to know what result a given method *can* secure and what it *cannot* secure, what are the advantages and the dangers of each.

I find in the literature of the subject four methods, which I call (1) the linguistic, (2) the psychological, (3) conceptual-symbolic, (4) the genetic. In the account which follows it is practically impossible to attain completeness: I select only those writings which seem to me good illustrations of the methods in question, and lack of space compels me also to omit the genetic method.

1. *The Linguistic Method*. — By this I mean, observation of the structure of sentences, of grammar and syntax, past and present, in all

¹ W. Jerusalem in *Viertelj. f. wiss. Philos.*, XXIII., p. 157, and J. von Kries, *ibid.*, XXIII., p. 1 ff. Psychological theories of the judgment are given by Herbart, Mill, Brentano, Lipps, Marty, Sigwart, Hobhouse, Wundt, Schrader, Cornelius, Stout, Erdmann (in part) and others.

² *Archiv. f. syst. Philos.*, VII., p. 1 ff.

³ *Logik* (1st ed.), p. 29, 223.

⁴ 'Logical Inquiries and their Psychological Bearings,' *PSYCHOL. REV.*, 1902, p. 117

languages, as a guide to the knowledge of the psychical and logical nature of judgment. I say *all* languages, and thereby include sign and gesture language; though perhaps not much of the detail of judgment is to be learned from these, for they seem to be formless. Wundt's attempt to assign to them a form seems to depend too much on his own theory of judgment,¹ and has been severely criticised by Delbrück² and Sütterlin.³ At any rate by far the richest field is that of articulate spoken and written language, and in what follows I refer to this alone.

This method may or may not be used in an exclusive manner. The exclusive use is characterized by the belief that the study of language is the sole and sufficient guide. Such was the attitude Max Müller⁴ and K. F. Becker.⁵ Those who do not so use the method believe that observation of language, though the basis of information, must be supplemented by introspection and perhaps other methods. The exclusive use has shown its futility and is now obsolete. The non-exclusive use is perhaps the oldest of all methods, and flourishes today more than is commonly thought. It has undoubtedly led to many discoveries, in spite of abuse and over-emphasis. As I believe that, though it has great dangers and is now rather unpopular, it is still of unique value, I shall give more space to it than to any other.

Its age is shown by reference to Plato and Aristotle,⁶ whose theories of judgment are generally admitted to be linguistic. Their linguistic bent has been followed by the modern adaptation of Aristotelian logic: the subject-copula-predicate theory. Indeed we may well say that very probably the idea that judgments have even a subject and predicate would not have occurred had it not been for the forms of language. According to Sigwart, "the judgment can be an object of scientific investigation only in so far as it is expressed in a proposition."⁷ So we can hardly wonder that this should be the first method employed. Moreover it is always very difficult not to use it: for all examples of judgment are couched in language, and the classification of judgments into universal, particular, singular, impersonal, predicative, existential, etc., follows a natural linguistic clue. The tendency to believe that thought on the whole corresponds to language is illustrated by the philologists as well as the logicians. Both have contributed largely to

¹ *Die Sprache*, I., p. 204 ff.

² *Grundfragen der Sprachforschung*, p. 70.

³ *Das Wesen der sprachlichen Gebilde*, p. 16.

⁴ *The Science of Language*.

⁵ *Organise der Sprache*.

⁶ Plato, *Kratylos* and Aristotle, *de Interpretatione*, Ch. III. and Ch. V.

⁷ *Logik*, Einleitung, § 8.

the theory of judgment from the linguistic point of view. Paul says: "The sentence is the linguistic expression or symbol, denoting that the combination of several ideas or groups of ideas have been effected in the mind of the speaker"¹ and "the grammatical relation is built up solely on the foundation of the psychological."²

Strong, Logeman, and Wheeler, following Paul, say "the sentence is the symbol whereby the speaker denotes that two or more conceptions have combined in his mind, and is at the same time the means of calling up the same combination in the mind of the hearer."³ Waitz says: "A sentence is not formed of single independent words, but of words which refer to one another in a particular manner, *like the corresponding thought*"⁴ (italics mine). Delbrück says: "A proposition is a consequent (erfolgende) expression in articulate speech *which appears to the speaker and hearer as a combined and closed whole.*"⁵ Sütterlin says that a proposition expresses 'an idea, an ideal complex, or even a union of two ideas or two ideal complexes, which appears to the speaker and hearer as a combined and closed whole.'⁶ Delbrück and Sütterlin differ here from Paul, because they believe that thought corresponds closely to language in the case of impersonals, vocatives, etc. Oertel says that sentences express "a compound idea, moulding it so that it will be articulate . . . and he (the speaker) does this because he cannot transmit a compound idea to his neighbor, but can only pass it on to him joint after joint and leave it to him to put them together."⁷ It will be noticed that this view is a kind of compound of Wundt's and Sigwart's views. Von der Gabelentz says,⁸ "To make thought clear is to articulate it (zergliedern). To the result of this articulating must correspond the linguistic expression." Sweet says:⁹ "Words are combined into sentences, this combination answering to that of ideas into thoughts." And "every grammatical category is the expression of some general idea—some logical category."¹⁰ Miklosich¹¹ unquestionably *bases* his belief in subjectless

¹*Principles of Language* (Eng. tr.), p. III.

²*Ibid.*, p. 112.

³*History of Language*, p. 92.

⁴*Anthropologie der Naturvölker* (Eng. tr.), p. 241.

⁵*Vergleichende Syntax*, I., p. 75.

⁶*Op. cit.*, p. 306.

⁷*Lectures on the History of Language*, pp. 280-281.

⁸*Die Sprachwissenschaft*, p. 6.

⁹*New English Grammar*, Part I., p. 6.

¹⁰*Ibid.*, p. 10.

¹¹*Subjectlose Sätze*. Cf. also Sigwart's criticism of Miklosich in *Die Impersonalien*, pp. 1-3.

propositions on the evidence of language, though psychological arguments are also used by him.

But not only philologists have used the linguistic method : our modern logicians use it constantly, even though it has been shown by Fr. Müller,¹ Bréal,² Sweet,³ Steinthal,⁴ Paul,⁵ Marty,⁶ Bosanquet,⁷ Lipps,⁸ Wundt,⁹ and many others that thought and language are far from exactly corresponding. We find that some who recognize the discrepancy, themselves tend to overlook it. Symbolic logic, in its treatment of propositions, starts from a linguistic basis. That propositions *as logical subject-matter* contain a subject and predicate in the illative relation would probably never have been suspected if language did not appear to offer this relation, in the typical propositional form *A is B*. And is the illative relation contained in the proposition 'the man runs' or 'snow fell yesterday' ? That it is consciously meant by the one who speaks or writes the proposition, introspection will hardly establish. That it is implied, to subsequent reflection, in what is consciously meant by the speaker or writer may be the case ; but who has attempted to prove this ? To illustrate again how logicians rest on language : Mr. Bosanquet has pointed out¹⁰ how Mr. Bradley, in spite of his professed aversion to the linguistic method, bases his refutation of the copula-theory on those very forms of language (*e. g.*, propositions like *Wolf!* or *Fire!*) he should repudiate. And any logician who argues from linguistic illustrations (and who does not ?) is really using the linguistic method.

So much for the method and for illustration of the frequency of its use. Now as to its dangers and advantages. It is clear that we are likely to run into error if we do not know where to draw the line between the forms of language and those of thought. It is easy enough to find divergence between thought and language, but a more difficult and more valuable service is in finding out just how far it extends. If it is short-sighted to expect exact correspondence between thought and language it is equally short-sighted to deny any correspondence at all — especially when you are surreptitiously arguing from linguistic

¹ *Grundriss der Sprachwissenschaft*, pp. 14 ff.

² *Semantique* (Eng. tr.), p. 220 ff.

³ *Op. cit.*, p. 11.

⁴ *Charakteristik*, p. 324.

⁵ *Op. cit.*, pp. 18, 300.

⁶ *Viertelj. f. wiss. Philos.*, VIII., pp. 71-75.

⁷ *Logic*, I., pp. 79-80.

⁸ *Logik*, p. 25.

⁹ *Die Sprache*, I., p. 215 ff.

¹⁰ *Knowledge and Reality*, pp. 156, 163.

models. The dangers, then, are twofold: we may expect too close a correspondence between words and inner thought-process or logical meaning, and we may go to the other extreme and deny *any* important correspondence. Today the latter course is the greater danger; we have reacted too violently against the Aristotelian tradition. The proper course will probably lie between the extremes: we shall make use of linguistic forms but shall know where to draw the line.

That the linguistic method may, in spite of all that has been said against it, possibly furnish some clues to the nature of the inner thought-process, will appear if we consider some of the arguments against it. Bosanquet says¹ that a judgment is an indivisible whole, while a sentence is a manifold of separate parts. A legion of writers have pointed out that the logical (or psychological) and the grammatical subject and predicate often do not coincide. Wundt² and others find that grammatical categories differ so widely in different languages, while judgment is practically one and the same everywhere, that there appears to be an utter discrepancy in structure between judgments and propositions. This, the argument from comparative grammar, is perhaps the strongest and most widely accepted objection to the claims of the linguistic method. Marty³ shows that there is always some of our thought which escapes verbal expression, while verbal forms express feelings, interests, wishes, fears, etc., which are no proper part of judgment; also that speech was originally not designed to express thought-categories (differing here from Paul) but grew up in the vicissitudes of life. Now as to the force of these objections. Judgment may be an indivisible instantaneous whole and yet have a complicated internal structure, similar to that of the sentence. And curiously enough Bosanquet himself believes that it has.⁴ The map we see at one glance has the same structure as the map we draw slowly. The discrepancy between logical (or psychological) and grammatical subject and predicate is admitted by most linguists, who nevertheless avowedly pursue the linguistic method. And further the inner thought might have a general correspondence in form to the verbal expression, without the same order or emphasis of parts, or without one-to-one correspondence throughout. Marty's first-mentioned objection only points out certain differences between thought and language, and does not, so far, even touch the question whether or not there may also be certain analogies. He might as well say I do not resemble my tall dark

¹ *Logic*, I., pp. 81-83.

² *Die Sprache*, I., p. 215 ff.

³ *Viertelj. f. wiss. Philos.*, VIII., pp. 71-75.

⁴ *Knowledge and Reality*, pp. 170-171.

brother in anatomical structure because I happen to be short and light-haired. As to his second objection, it is doubtful how far it is true, for many philologists do not accept it;¹ and even if true, it by no means precludes a correspondence. Do not our inner thought-processes, as well as our language, grow and develop in accordance with the practical needs of life?² As to the argument from comparative grammar, I can only indicate briefly why it seems to me inconclusive. How can you be sure whether this or that grammatical category or part of speech exists in a given language? Two kinds of test have been used. First, parts of speech were defined according to the nature of the facts to which they referred. Thus, a verb was supposed to denote *always* a process, state, or activity; a noun, a thing or substance; an adjective, a quality or property. Wundt himself adheres to this kind of test,³ defining a verb by the term *Zustand*; and also Müller,⁴ defining a verb by *Thätigen*, as well as M. Bréal, who says,⁵ 'the class of verbs presupposes a system of persons, tenses, moods.' Secondly, we find several writers defining parts of speech not by the nature of the facts to which they refer, but by the function they perform in the sentence.

According to this view, for example, we have a verb whenever we have a word *used predicatively*, whether that same word be used in other connections nominatively or adjectivally, or even adverbially, and whether it refers to a process, property, thing, person, or manner. This point of view is taken by O. Jespersen⁶ when he speaks of 'utilizing word-position for grammatical purposes';⁷ by Sayce when he quotes with approval from an anonymous work: 'It is not what a word signifies that determines it to be this or that part of speech, but how it assists other words in making up the sentence';⁸ by Sütterlin in the following: 'The verb constitutes a class only because of its use in the proposition'⁹ and "when the Hottentot says 'my eyes' for 'I see' he represents by his words today probably quite the same as

¹ *E. g.*, Paul, Sweet, Strong, Whitney, v. der Gabelentz.

² Professor Baldwin has emphasized the social character of thought and shown how its development as an inner process is intertwined with its development according to the needs of linguistic usage. Cf. 'Thought and Language,' *PSYCHOL. REV.*, May, 1907.

³ *Die Sprache*, II., p. 130.

⁴ *Grundriss der Sprachwissenschaften*, p. 108.

⁵ *Semantique* (Eng. tr.), p. 187.

⁶ *Progress in Language*, p. 97 ff.

⁷ *Ibid.*, p. 110.

⁸ *Principles of Comparative Philology*, Preface, p. ix.

⁹ *Op. cit.*, p. 80.

we ourselves by our words'¹ and 'if position decides whether an adjective is used verbally or not, it is the same as if we had a verb, not an adjective.'² Also Bosanquet says:³ "Some languages, we are told, have not the distinction between noun and verb. They must, however, have some way of indicating when a word carries a predication: *and this sign, whatever it may be, belongs to language.*" Now inasmuch as parts of speech depend for their very existence on their being in the sentence, this second way of testing their presence in a given language seems much more logical and more in accordance with the living use of language. If we adopt it, we find that Bosanquet's statement above is well borne out. Almost every known language seems, according to the evidence of Fr. Müller's encyclopædic *Grundriss*, to have some fixed way of indicating the predicative relation, whether by order, pronominal suffix, accent, or something else. It seems justifiable then to make the general induction that every language contains both noun and verb in at least *some* of its sentences — if we adopt the test suggested above. And so the argument from comparative grammar does not militate against a general, though far from detailed, correspondence of thought and language.

Assume now that we find a general common usage, among practically all known languages, which reveals the predicative relation. This should furnish good evidence that those judgments which are expressed by this relation, themselves contain it, as inner thought-processes. For why should *not* the inner thought-process correspond to the outer verbal form? What would prevent that correspondence? Many preventing factors may be named; varying racial characteristics, need of brevity, esthetic charm, custom, analogy, influence of languages on each other, practical needs, and so on. But what is common to all, or nearly all, languages, would probably be free from the influence of these factors; for these factors all vary more or less in different linguistic stocks. The common structural element would not be due to the influence of any of these factors; it would be due to one factor not yet mentioned, namely, the desire of the speaker to reveal by his words what is in his mind. For this factor may undoubtedly be verified by introspection today; and I know of no linguist who has thought of denying its existence. Whether the speaker desire to reveal his inner thought-processes for theoretical, practical, or esthetic purposes, we cannot deny that he still would naturally tend to reveal them in his speech. The common structural element in all languages, then,

¹ *Ibid.*, p. 125.

² *Ibid.*, p. 162.

³ *Knowledge and Reality*, pp. 170-171.

should correspond fairly well to the inner judgment. Indeed if we consider the matter genetically, we cannot fail to be impressed by the close interdependence between the development of judgment and the development of language. I may quote here a remark of Professor Baldwin:¹ "In language . . . we have the tangible — the actual and historical — instrument of the development and conservation of psychic meaning."

Having by the linguistic method thus gotten an essential criterion of many judgments, it would remain to investigate the nature of this criterion. We need to know what the subject-predicate relation is: how to define it, how to reduce it, if possible, to lower terms. As to the question, what it means to us psychologically, work has been done; *e. g.*, by Professor Marty² and by Miss E. H. Rowland.³ Professor Marty, unfortunately, is already pledged to Brentano's theory; he therefore attempts to explain away that relation by the concepts 'double-judgment,' 'zuerkennen' and 'aberkennen.' To my mind this adds nothing to our knowledge, and explains nothing (especially as he regards the two last concepts as indefinable); but the question is still an open one, and I think Professor Marty's uncommonly thorough studies deserve more attention than they have received. Miss Rowland's interesting study labors, I venture to think, under a mistaken idea of what constitutes a part of speech; especially in her treatment of verbs. Her view seems to me to fall under the first of the two tests mentioned above. Her verbs are words denoting action; whereas we use many verbs which do not denote action, such as *be, lie, suffer, seem*. A part of speech should be defined by its function in the sentence, not by the kind of fact to which it refers. The problem, however, is being attacked, and we may hope that more work in this field will be done.⁴

What, then, is the advantage and what are the limits of the linguistic method? Its unique advantage is that it should give, by an empirical induction from tangible, undoubted facts, something of the structure of the inner thought-process. Where introspection fails there objective physical evidence must take its place. Its limit is, that its

¹ 'Thought and Language,' *PSYCHOL. REV.*, May, 1907, p. 191.

² *Viertelj. f. wiss. Philos.*, VIII., pp. 56, 161, 192; XVIII., pp. 320, 421; XIX., pp. 19, 263.

³ 'The Psychological Experiences connected with the different Parts of Speech,' *PSYCHOL. REV.*, Mon. Suppl., Jan., 1907.

⁴ Of course I do not say that *all* judgments contain the predicative relation. Some may have no subject, some no predicate, perhaps. This leads to the familiar problem of impersonals and existentials.

results are not themselves psychical or logical material, and must be *interpreted* by psychological experiment and analysis and by logical analysis. They give at most only the skeleton, not the living process. For example, when we find the subject-predicate structure in propositions and therefore in judgments, we need further to know the psychological and logical meaning of that structure. Or when we find (if we do) that many propositions (and therefore judgments) lack structure entirely, we must apply some other method than the linguistic, to investigate their nature. The linguistic method can serve as a good foundation for the theory of judgment; it cannot give an exhaustive analysis of its psychological or logical meaning.

2. *The Conceptual-Symbolic Method.*—This has two parts: a conceptual basis and a superstructure of symbolic method. Its basis is the belief that the judgment is properly not a psychical event or process. "No mere psychical occurrence," says Bosanquet,¹ "can by any possibility be a judgment." It is out of the question to discuss here the grounds for this belief; they depend on philosophical considerations to the effect that meanings, universals, and the entities of logic are non-existential, non-sensuous, something like the Platonic Ideas.² This view is shared by Husserl, Schuppe,³ G. E. Moore,, Bradley,⁴ Bosanquet,⁵ Erdmann,⁷ Marbe,⁸ and many others, and is⁹ among logicians, perhaps the prevalent view today.⁹ As to the superstructure, or symbolic method proper; the nature of the conceptual subject-matter which makes up judgment (generally called the *proposition*, because it contains the relations indicated by linguistic forms) is to be investigated as a branch of mathematics or logistics. Writers in this field are well known: Professor Schroeder, Mr. Peirce, Dr. Ladd-Franklin, Professor Royce, Mr. Russell, Couturat, and many others.

This method is relatively new (dating probably from Leibniz) and so far has devoted itself more to the forms of reasoning than of judgment; but contribution has been made to the latter. For our purposes it is so unambiguous a method as to need no definition; I

¹ *Logic*, I., p. 75.

² Cf. B. Russell, '*Principles of Mathem.*,' Preface, p. viii.

³ *Archiv. f. syst. Philos.*, VII., pp. 6, 10.

⁴ *Mind*, 1889, p. 177 ff.

⁵ *Principles of Logic*, Ch. I.

⁶ *Op. cit.* above.

⁷ *Logik* (1st ed.), I., p. 243 ff.

⁸ *Experimentell-psychologische Untersuchungen über des Urtheil*, Ch. III.

⁹ Cf. *Proc. Arist. Soc.*, 1905-6, p. 224 ff.

proceed at once to state what seems to me its unique fruitfulness, and what its special danger, as applied to our problem.

Dr. Ladd-Franklin showed¹ that if the usual illative relation of the proposition is replaced by a symmetrical copula, the latter will suffice to give all the results the former could give. Thus, if instead of *x is y* we read *x is inconsistent with not-y* (two symmetrical relations instead of one asymmetrical relation) we get the same results as before. It would follow then, that the predicative relation is no ultimate, irreducibly asymmetrical affair, as Erdmann, Marty and others seem to think. Here logical analysis has thrown light on the make-up of the subject-predicate relation; and it suggests that more may be done, in the way of reducing that relation to even lower terms. This brief indication shows, I think, the kind of work which only the symbolic method can do. Namely, it can take as subject-matter for analysis what we learn from other methods about the structure of judgment and give a definition of it, in terms of logical indefinables. We shall learn then, what a knowledge of the actual occurrences in judgment would never tell us, the *significance* of those occurrences with respect to a system of logical values. Psychology, language, and genetic method may give us the facts about judgment; but definition of those facts in terms of logical indefinables they cannot give, without themselves using the symbolic method.

The danger to which this method seems to me liable is suggested by an objection which many logicians might offer to the above remarks. I said, the symbolic method should analyze the meaning of the data given it by psychological, etc., study of the *actual occurrences* in judgment. Many logicians, however, maintain that they do not study facts, and are quite indifferent as to whether their subject-matter *exists* either physically or psychically.² Now in one sense no one need hesitate to admit this. If we inquire whether we actually have in mind a symmetrical copula when we make a judgment like 'the man runs' we find that in most cases we do not. But the symbolist may be concerned with the logical significance of what we actually have in mind; and it is no concern of his, whether or not we have that significance actually in mind. He must therefore *abstract from* existence. But it is quite another thing to *deny* that his terms and relations apply to existing psychical processes. His danger, I think, lies here. If he does not take as his data the facts of judgment or some part of them,

¹ Paper on *The Algebra of Logic* in *Johns Hopkins University Studies in Logic*.

² Cf. B. Russell, *Mind*, 1905, p. 398.

he will be told by the psychologist, "You are studying a very interesting problem no doubt, but it is not the sort of thing men have in mind or mean when they daily make judgments, nor is it essentially connected therewith. You have therefore no right to call it the symbolic study of judgments or propositions." In short, if his contributions are to be anything but consequent imaginations, however well-knit in structure, they must *start from* solid psychological ground. Otherwise they do not constitute knowledge; they are mere works of art. And I take it, no devotee of 'logistic' wishes to occupy himself *only* with designing well-proportioned castles in the air.

3. *The Psychological Method.* — By this I mean, investigation of such facts as (1) what actually is above the threshold of consciousness when we judge; (2) what conditions our judging and results from it; (3) what significance it has for general psychical life; (4) its physiological correlates, if it has special ones; (5) its underlying 'dispositions' psychological or physiological, and so on. These may be investigated in the individual judging alone or in communication with others, or in its pathological manifestations, and so on, following the current divisions of psychology. The methods used are two; either direct introspection, or inference from observed physical events to the inner thought-process. Of course I abstract here from the genetic study of the above questions.

This psychological procedure has been *used* more, perhaps, than any other except the linguistic. Almost all the standard treatises of logic give some psychological account of the matter. The advantage of this procedure, *if it could be carried out*, is obvious; it deals with facts, and without proved facts, no respectable theory of the judgment can exist. That it has been carried out to a certain extent, with general agreement between the results of different investigators, Professor Pillsbury has shown. But beyond a certain extent, there does not seem to be much hope of demonstration of results. For we cannot make much use of introspection; and introspection is naturally surer than inference from physical events. Marbe's failure¹ to get results is only what one might naturally expect.² Judgment is so habitual with us that its machinery (if it has any) has practically all disappeared from consciousness. Marbe's conclusion from his failure, that judgment is not essentially a psychical process at all, is however, quite unwarranted. As well say that there is no psychical process in count-

¹ *Op. cit.* above.

² Cf. Professor Royce's criticism of Marbe in his above-mentioned paper, pp. 116-117.

ing, because adults have learned to add instantaneously. If any progress is to be made however it would seem that it must be by inference from the physical manifestations of judgment or by introspection of other phenomena which are conditioned by judgment. Here the field is open enough, and astonishingly little has been done. It is to be hoped that experimental psychologists will take up the problem. At present the best we can do seems to be to fall back on the linguistic method, but this, as we have seen, gives only the skeleton of their judgment.

If we would investigate the judgment as a living process, we had better turn, I think, to the genetic method. But examination of this must be deferred.

PSYCHOLOGICAL LITERATURE.

SCIENTIFIC CONCEPTS.

Ueber die erkenntnistheoretischen Grundlagen der biologischen Naturwissenschaften. Mit speziellen Rücksicht auf : A. Pauly, Darwinismus und Lamarckismus. F. v. ASTER. Viertelj. f. wis. Phil. u. Soziol., 1906. 397-435.

The impression which one gets of this article is, that, although it contains much of value, the program which the author has indicated by his title has been carried out only very incompletely. For, while the epistemological foundations of biology are many and far-reaching, the author considers only those which concern evolutionary theory and teleological doctrine. As concerning these two, while it is to be admitted, perhaps, that they are very germane to biological problems in general, it is fair to ask if they are as much 'foundations' as they are inductive results.

The author first selects the Darwinian theory for discussion. Epistemological reflection shows that there are present in this two distinct elements, namely, the general evolution-theory *and* natural selection — the latter being Darwin's special contribution. The former conditions the latter, but not conversely. Objections can, of course, be offered to both — to the former that it is hypothetical, to the latter that it is impossible, but the general theory of evolution can not be given up without removing the basis on which the whole structure of the organic sciences rests. For it is by means of this alone that a 'natural classification' as the only correct and not-arbitrary one can be obtained. It is in this sense, then, that our author regards the theory as the 'epistemological basis' for the biological sciences.

However, the theory brings with it certain special problems, among which there is that of the origin of purpose-functioning organs, *i. e.*, organs adapted to certain ends, and by which species are separated from species. The importance of this problem is increased by the fact that the phyletic series presents in general a development from simple to complex — complex in the sense of the presence of organs serving more special ends.

The *simplest* answer to this problem is that the origin and development of such organs is conditioned by external life-conditions and their differences; but v. Aster thinks that really this accounts for

the purposefulness incompletely. In place of it the theistic view is sometimes advanced, but this is not scientific; yet it is as good as the explanation by 'nature.'

Now the Darwinian Theory, through its coördinate principles of variations, of superior adaptation, of advantage in the struggle for existence, etc., presents a definite answer. But the author considers — and not necessarily correctly, I hold, — that in such a scheme the external conditions furnish only the opportunity for the working of the 'Selection-principle.' The chief advantage of it is, however, that it is identical with a mechanical explanation of the origin of organic 'Zweckmässigkeiten.'

Yet to the Selection-theory many objections are offered; thus it is held, as against it, that the cause for adaptations is neither in the change of environment alone, nor in this *and* natural selection, but, rather, in the organism itself; *i. e.*, that there is immanent in it the ability to react in a purposeful manner. That there is a difference between this and the Selection-theory is clear to our author; for here, he says, we have mechanism and simplification, there, the acceptance of the presence in living matter of a causality not found in inorganic phenomena. Evidently he does not regard the question as settled, else why his discussion? Accordingly the special problem which is considered from this point to the end is whether organic causation is like inorganic. This is really the only 'Grundlage' discussed by him.

He begins by emphasizing a distinction between objective and subjective purposefulness. Thus, to say that an object or action is purposeful in the first sense means simply that it has as a necessary consequence the realization of something which is *regarded* as the end; but in this sense every effect is the purpose of its cause. On the other hand, subjective purposefulness means, not that a cause is *regarded* as means to a certain end, but that there is a consciousness of this end as an end and of the means as means; this the author calls purposeful *activity* (*Zwecktätigkeit*).

Now, our author continues, one can, of course, express or account for the presence of an objective purposefulness *metaphorically* by identifying it with an unconsciously working force or impulse (*Trieb*), but 'Trieb' in this sense is in no way analogous to a conscious volitional act. 'Trieb' has another sense, too, namely in the view that conscious acts of will presuppose impulsive action from which they originate, though in the first sense the term is sometimes used to designate the presence of something making for perfection, etc. (*Vollkommenheitstrieb*); but in no case does this furnish a scientific solution

of any problem; for perfection presupposes valuation, etc., and the question is left as much undecided as by the theistic position. More justified is it to speak of a 'Selbsterhaltungstrieb,' for this makes the origin of species from external causes understandable, though the 'end' might have to be regarded as the conservation of the species rather than of the individual. In fact there is always the possibility of a conflict between individual organism and species as well as one between cell and organism.

All these considerations lead the author to reformulate his question now as follows: Is the origin of purpose-working organs dependent on a 'Zwecktätigkeit'; or is it explainable by reactions, which, while conducive to a conservation of species, demand in no respect any kind of an immanent conscious principle? In answering this he directs his argument against an author, Pauly, who accepts the former position, considers himself a Lamarckian, regards the struggle for existence as a fiction, and insists that 'psychical factors' are everywhere effective in the organic world. He develops this as meaning that in every case the distinctive cause of a purposeful reaction is a psychical complex of 'felt need' and striving toward a 'known end' with the 'thought on the means' between these two. Briefly, he carries over into organic nature all the psychology of a human volitional act. For, he argues, if this is not done, then purposeful action takes place in two ways, namely, as a subjective, entirely conscious act, and as a mechanistic selection process. The principle of parsimony compels him to reduce the two to one.

Now v. Aster considers that the 'kernel' in this very *typical* argument is that the 'felt need' plus the 'striving' itself is made the cause of the appearance of purpose-serving organs, etc. But to make this the cause in every case demands the 'omnipotence of the need,' but, since it is just this that v. Aster finds contrary to fact, he thinks thus to refute Pauly. For, he argues, even in our own case only certain limited parts of the body can be influenced by the will, and in no case does the detailed mechanism, the means, come into consciousness; nor does the body always obey the will — rather, only when the will stands in connection with a certain physiological constellation in the brain can the act follow, but even then only in certain cases, namely, when it is in the *interest* of the individual to have it so, *i. e.*, when the act is useful or 'objectively purposeful.' From this v. Aster concludes, in refutation of Pauly as he thinks, that 'subjective purposefulness' is only a special case of 'objective,' thus reversing this author's reduction.

Concerning this, it seems to me, all that must be added to a position

like Pauly's in order to make an attack like v. Aster's quite pointless *logically*, is that in all organic structures, organs, events, etc. there is a consciousness or a will immanent, yet discontinuous with other consciousness. Thus the purposefulness of all reflex acts of the lower centers is compatible with a 'spinal cord consciousness' and in the very nature of the case this cannot be disproved by appealing to the introspection of cortical consciousness.

However, v. Aster concludes from his argument that, for example, in the case of our striving after that which is pleasurable, etc.,—this being the useful—there is an unusually purposeful arrangement: our striving and willing serve the objective purpose of conserving the organism without our being conscious of this. Every organism in fact, has the peculiarity that it reacts purposefully, and so conduces to its own conservation, and, with a change of environment, to new species. The scientific problem is, then, to show that for such and such a function an organ must appear in a certain manner and not otherwise.

As concerns v. Aster's 'objective teleology' I cannot see anything in it, as he has defined and developed it, which is really different from mechanism. The only ground for retaining the term is, accordingly, possibly to describe vital phenomena, inasmuch as they have certain specific characters coördinate with certain specific inorganic properties, as a special case of mechanism. Accordingly, I see really no ground for, at least only confusion in, the conclusion reached, that the origin and nature of organic bodies can not be explained by the laws of mechanistic physics and chemistry. For such an explanation or subsumption can be granted and yet the admission be made at the same time, that, for specific organic properties, specific organic laws in terms, perhaps, of teleology must be found. Any dualism, then, would be only a dualism of species under the genus mechanism.

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Space and Geometry in the Light of Physiological, Psychological and Physical Inquiry. ERNST MACH. Translated by T. J. McCORMACK. Chicago, Open Court Publishing Co., 1906. Pp. 148.

"The three essays constituting the present volume were written originally for *The Monist*, 1901-3. Last year they were partly incorporated in their original German in Professor Mach's latest published work, *Erkenntniss und Irrtum*."

The titles of the three essays are: 'On Physiological, as distinguished from Geometrical, Space'; 'On the Psychology and Natural Development of Geometry'; 'Space and Geometry from the Point of View of Physical Inquiry.'

Some of the topics treated (briefly) in the first essay are: The space of vision and that of touch; the correspondence of physiological and geometric space; the non-coincidence of the physiological spaces; correlation of visual and tactual space, and physiological influences in geometry. Under the last heading a list of instances are mentioned, including, for example, right and left; division of space into right angles; positive and negative coördinates as these are reckoned to the right or to the left, upward or downward.

In the second essay, again, many topics are briefly treated. Some of their titles will suggest the contents: The Notion of Constancy, of Rigidity, Physical Origin of Geometry ('geometry bears the distinctest marks of its origin from the interest centering in the spatial relations of *physical bodies*'), Practical Origin of Geometry, Empirical Origin of Geometry.

"Our geometrical knowledge is derived from various sources. We are *physiologically* acquainted, from direct visual and tactual contact, with many and various spatial forms. With these are associated physical (*metrical*) experiences (involving comparison of the space-sensations evoked by different bodies under the same circumstances), which experiences are in their turn also but the expressions of other relations obtaining between sensations. These diverse orders of experience are so intimately interwoven with one another that they can be separated only by the most thoroughgoing scrutiny and analysis. Hence originate the widely divergent views concerning geometry. Here it is based on pure visualization (*Anschauung*), there on physical experience, according as the one or other factor is overrated or disregarded. But both factors entered into the development of geometry and are still active in it to-day."¹

In the third essay the author endeavors 'to define his attitude as a physicist toward the subject of metageometry so called.'²

"Our notions of space are rooted in our *physiological* organism. Geometric concepts are the product of the idealization of *physical* experiences of space. Systems of geometry, finally, originate in the *logical* classification of the conceptual materials so obtained. All three factors have left their indubitable traces in modern geometry. Epistemological inquiries regarding space and geometry accordingly

¹ P. 83.

² P. 94.

concern the physiologist, the psychologist, the physicist, the mathematician, the philosopher, and the logician alike, and they can be gradually carried to their definitive solution only by the consideration of the widely disparate points of view which are here offered."¹

In this essay too we have a great variety of topics each briefly treated but all bearing on metageometry, *e. g.*, Riemann's Physical Conception of Geometry, the Measure of Curvature and the Curvature of Space, Sacchieri's Theory of Parallel, Researches of Gauss and of Stolz, the contributions of Lobachevski and Bolyai, and so on. In short, "by the comparison of space with other manifolds, more general concepts have been reached, of which the geometric represents a special case. Geometric thought has thus been freed from conventional limitations, heretofore imagined insuperable.

"By the demonstration of the existence of manifolds allied to, but different from space, entirely new questions have been suggested."²

Thus the purpose of the author is to show and to trace the empirical origin of the highest abstractions in geometrical reasoning, and thereby to add this further argument in support of the extreme empiricism and anti-conceptualism of his general philosophical views.

We certainly have to thank the Open Court Publishing Company for adding this little book to the other works of Professor Mach that they have published in English.

W. T. MARVIN.

PRINCETON UNIVERSITY.

NATURE AND VALIDITY OF KNOWLEDGE.

Ueber die Erfahrungsgrundlagen unseres Wissens. A. MEINONG.
(Abhandlungen zur Didaktik und Philosophie der Naturwissenschaft, 6.) Berlin, 1906. Pp. iii + 113.

A review that would do full justice to this monograph would make as many pages of print as the original. It is a most concise and keen analysis of perception as an act of knowing and of its evidential value. Unfortunately the book has the fault of most of Meinong's writings, namely, a needlessly difficult style, especially unfortunate in the present instance where the writing is intended for readers outside the innermost philosophical circle. This fault is to some extent redeemed by a careful three-page summary at the end of the book.

The book is divided into four sections:

I. These coexists with our empirical knowledge a knowledge independent of experience and, in this sense, *a priori*. This independence, however, does not belong to the presentation (*Vorstellung*) but

¹ *Ibid.*

² P. 143.

to the judgment (*e. g.*, red is different from green). *A priori* knowledge is based upon the nature of its subject-matter; its truth is evident; and its validity is necessary quite apart from the question whether or not its object exists.

Experiential knowledge in the proper sense, or immediate experience, is synonymous with apprehension (*Wahrnehmung*). All instances of apprehension (no matter how this fact may be obscured by language) are existential judgments with positive 'objectives' (so the author names the objective thing whose existence is asserted). Their objects are real, are things, never mere qualities. That is, we never apprehend merely the quality green but *something* green (not grün, but ein Grünes); and the fact that *green* is not green whereas a *green thing* is green distinguishes between a quality and a thing. Again, all apprehension is *present* apprehension and has, as an essential characteristic evidential value (*Evidenz*). This latter though immediately given lacks complete certainty (*Notwendigkeit*).

II. The chief problem of the monograph is: When may perceptions (*Aspekte*, that is, *Scheinwahrnehmungen*) be regarded as true acts of apprehension (*wirkliche Wahrnehmungen*)? At first we are led to say that the whole field of external perception cannot be so regarded, for primary qualities are no less subjective than are the secondary. This introduces us to the chief discussion of the book, in which are examined first inner or self-perception, usually thought to base its judgments on complete evidence, and secondly outer perception, often thought to lack all evidence.

III. This section gives an admirable analysis of the evidential value of inner perception. Of course it is an error to ascribe to inner perception complete certainty; still such a thing as inner apprehension is to be found. The most favorable conditions for this are offered by objects existing only in the presentation itself; or, as the author puts it, "what really exists here are inwardly directed contents," that is, contents interpreted as belonging to the self.

Now apprehension must be *present* apprehension but this condition cannot be fulfilled by self-perception, for the best the mind can do is to have the apprehension and its content meet at a present point or in a present line (in einem Gegenwärtigkeitspunkte, resp. einer Gegenwärtigkeitslinie). In short the normal relation between the two is immediate succession. Hence, the evidential value of inner perception has degrees, just as has memory, — degrees varying with the nearness by which it approaches the present as a limit (*Gegenwärtigkeitsgrenze*); that is, the nearer perception and content perceived

come to be coexistent, the more certain the judgment. Thus even inner perception is conjectural and has corresponding degrees of evidential value.

IV. This gives the author some hope for the evidential value of external perception (!) We are not obliged to deny it every characteristic of genuine apprehension (!) Here is another book in which problems of epistemology are muddled by the issue between realism and idealism and (alas) also by the question of the primary and secondary qualities. Here is the fourth section of a keen piece of analysis rendered utterly fallacious because the author transposes the logically prior and posterior. To make the problem of the evidential value of outer perception and the definition of the term 'exist' logically dependent upon the issue between realism and subjective idealism, instead of making the latter dependent upon the former, can only lead to such misunderstandings as the following:

"Man hört zwar oft genug, dass es die 'Phänomene' der Wärme, des Lichtes, etc., sind, die die Physik zu erforschen habe; und noch in seiner jüngsten Publikation legt E. Mach in bezug auf 'das Land des Transzendenten' das 'offene Bekenntniss' ab, 'dass dessen Bewohner' seine 'Wissbegierde gar nicht reizen.' Die Zuverlässigkeit innerer Wahrnehmung und die bewährte Beobachtungsgabe des hochverdienten Physikers in gebührenden Ehren: aber ich kann unmöglich glauben, dass er seine Erlebnisse im gegenwärtigen Falle wirklich richtig beschrieben hat. Und so zweifle ich nicht daran dass gerade dieses 'Land des Transzendenten' es ist, dem auch seine so erfolgreichen Bemühungen galten und gelten. Phänomene als solche sind unentbehrliche Erkenntnismittel, sie sind aber niemals Ziele unseres Strebens nach Erkenntnis des Wirklichen."¹

Thus we are here treated again with a discussion whether or not, and how far, *noumena* are knowable, and all this to determine the evidential value of outer perception. The problem of the primary and secondary qualities remains, in the author's mind, the same muddle that Locke left it. If we cannot solve these problems to the satisfaction of all of us, it does seem too bad that we cannot at least agree which of two problems logically precedes the other; and if we cannot come to an agreement regarding the solution of one problem, it seems too bad that we are therefore unable to understand one another when we take up the next.

At any rate we are told that we have in outer perception good conjectural evidence for the existence of things, but poor evidence for

¹ P. 106.

their properties. However, we have good reason to believe that thing differs from thing when its phenomena differ, and we can do something in the way of counting external entities.

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The Nature of Truth. HAROLD H. JOACHIM. Oxford, 1906.

This work is a criticism of three conceptions as to the nature of truth. No one of these conceptions nor any combination of them is regarded as adequate and final, so that the outcome of the criticism is mainly negative. Although this result is held by Joachim to have a positive value in making clear where the problem lies, it seems to the reviewer that his main contribution to the subject lies in the various criticisms he takes up apart from the rather unsatisfactory negative result. These criticisms we consider to be of the very greatest value.

The first conception with which he deals is that of truth as 'correspondence,' *i. e.*, we have truth when an idea or a judgment of the mind is in one-one correspondence with a reality or a fact other than itself. This is the old copy-theory or representative theory of truth. According to Joachim there seem to be three difficulties with this conception. First, in a one-one correspondence between an idea and a reality, though it may be easy to see the relation between one part of the idea and the corresponding part in the reality, it is difficult to understand the relation between the whole of the idea and the whole of the reality, because the whole is teleological in nature and not a mere sum of its parts. Secondly, if the idea is exactly like the reality, then it becomes identical with it and we have no longer any correspondence. Thirdly, a judgment of the mind cannot be absolutely separated from its corresponding reality, for a judgment is after all something real, and reality cannot be conceived except as in some way given to a mind. Complete separation of reality and mind would mean no relation between them and hence no truth.

The second conception makes truth a 'quality of independent entities.' Truth is independent of the mind, 'experiencing makes no difference to the facts.' Every fact is in and for itself, it may or may not become related to the mind so that the mind may apprehend it. If this conception is accepted, a disagreeable alternative must be faced, The truth which never is apprehended by the mind is unknowable; and such truth as reaches the mind becomes the mind's individual possession, leaving it no means of getting beyond a sort of subjectivism.

The third conception is that of 'systematic coherence.' Just as a

hypothetical judgment involves something beyond itself, so every fact or every single truth leads to some further truth; and just as a hypothetical judgment ultimately falls back upon a categorical judgment, so single truths and facts involve something final. This final something is a 'significant whole' in which every truth and every fact must find its place and in which all parts of the whole hang together in an organic fashion. This 'whole' is 'self-fulfilling, and 'self-fulfilled,' it is a complete 'concrete' individual, an 'ideal experience.' The difficulty with this conception comes out when we consider that all contradictions must be reconciled in the 'whole'; truth and error, the universal or static side of human knowledge, and the side of growth and development must find a place in the 'ideal experience.' But so far as human knowledge goes this reconciliation can hardly be accomplished. For all knowledge there is a kind of dualism between the universal and the particular, between the static and the dynamic; the most perfect truth we can imagine must be true of something, hence it is relative. Are we therefore forced to return to the 'correspondence' conception of truth? Joachim thinks not, because it leaves us in worse difficulties than the 'coherence' conception does. 'Correspondence' is a 'symptom' of 'coherence,' and 'coherence' is a 'symptom' of ultimate truth, the reality of which Joachim never doubts, although he admits that it is unknowable.

Joachim's main difficulty seems to be that he puts reality above knowledge, that he does not develop an idea of truth within the realm of the knowable. We should agree with some form of the 'coherence' conception of truth, but we hardly think that it should be characterized as an 'experience' or as 'individual,' though we should hold to its ideality. A mathematical or physical system of truth ought to give us a basis for the essential characters of truth. Abstractness should not be feared, for an abstract whole is just as much a whole as one which aims at including all single truths and all facts. It may be that through the combination and interaction of a number of relatively independent abstract systems the whole of truth can best be characterized: such a whole would not be 'organic' or 'individual,' but it would be coherent and therefore in some sense one.

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The Ground of the Validity of Knowledge. EDWARD G. SPAULDING. J. of Phil., Psychol., and Sci. Meth., 1906, III., 197-208, 257-266, 309-317, 371-380.

In this series of four papers Professor Spaulding discusses the epistemology of scientific knowledge and knowing. At the outset, in order to avoid misleading ambiguities, 'experience' is limited, by a tentative definition, to the bounds of the conscious individual. Among the many kinds of experiences the most important is the experience of need, or conscious demand, characterized by a feeling of conflict and accompanied or followed by the felt-need of a readjustment. From a classification of needs the writer selects the intellectual needs, subdivided into logical and alogical, as deserving special attention. To the 'logical need,' defined as the felt demand for formal consistency, is opposed the 'alogical need,' the felt demand for success. Because this need, arising when a readjustment is demanded between the individual and his environment, has for its ideal not formal consistency but success, and because a successful readjustment is known to preserve and further life, the alogical need may well be called biological. Moreover, if the ultimate end of all needs is the conservation of life, then to the biological need (in its broadest sense) as end are subordinated all other needs as means. Obviously there is required a reliable means which will constitute the successful readjustment demanded by the alogical or biological need. This means is found in science and especially in physics, which, as a method of prediction by the use of symbols, furnishes us with the fore knowledge of things and events requisite for success. But if knowledge of the future, or the inference-prediction of physical science, is to constitute the condition of successful readjustment, it is of the utmost importance that we discover the conditions of successful prediction. To insure the success of this inference-prediction, our practical attitude demands, in addition to the formal consistency of the inference-process and the correctness of data, an order and uniformity external to and in some way 'other than' the inference itself. This order may be termed the *transcendent* as implying a something which is in some respect 'beyond' the immanent.

The demand for a transcendent is one of implication. This implication is not, however, a matter of mere assumption, nor is it to be regarded as bare implication if implication and assumption are understood to reject the proofs for the existence of a transcendent; that which is assumed may exist independent of the assumption, and the implied is always provable. The structure of implication in general may be stated as follows: That which is implied is both 'beyond'

and 'in' the implier, and this simultaneous 'beyond' and 'in' forms two points in an unequivocal and asymmetrical relation. Of this genus there are two species: Logical implication, in which this generic relation, constituting here the formal consistency of the inference-process, holds between 'terms' which are both propositional; and alogical or biological implication, where one term of the relation constituting in this species the condition of success, is external, independent of and different in kind from the other term. Thus the demand of alogical-inference for a transcendent is one of biological implication; the transcendent is both 'in' and 'beyond' the inference-process, conditioning its success, as the implied is 'in' and 'beyond' the implier; it is a permanent, unalterable 'other,' independent of that which implies it in every respect except for its implication. Inasmuch as the transcendent is, in some way, 'in' the inference-experience, it is possible at this point to recognize a wider experience which will consist of the conscious experiences of the individual plus the transcendent.

It has been indicated that in the logical inference-process, by virtue of the presence of formal implication, a transcendent is necessitated. Not only do logical and alogical knowledge by inference imply a transcendent, but an analysis of other types of alogical cognition, as memory, imagination, perception and the concept (which also are found to be characterized by the determinate relation of the simultaneous 'in' and 'beyond'), leads to the conclusion that all knowledge transcends itself. Moreover, as a distinguishing mark between logical and alogical cognition, it is evident, from a further examination of normal perception and its object, that the reference not only of alogical inference but of all alogical knowledge to a transcendent, is, in every particular, identical with biological implication.

'Correctness of data,' which, in addition to consistency and a transcendent, conditions success, is constituted by an unequivocal correspondence between the qualitative and quantitative differences in the 'content' of perception and those in the object. The objective differences imply that the transcendent is a manifold, in which the perceived object exists as an element in uniform connection with other elements. Further, from the inevitableness of perception, it becomes evident that the transcendent manifold is a causal agent, the mediator of the reference to itself and, because the ontological predicates of causal inter-connection and permanence justify the generalization, the possibility of all experience.

For further information as to the manner in which the transcend-

ent is known in those conscious experiences which it conditions, we may again turn to physical science and analyze the knowing experience of the physicist. Such an analysis discloses the following constituents: First, a consciousness of symbols; second, the meaning or 'content' of these symbols, present as imaged or not-imaged, either above or below the threshold of consciousness, and developing relations which are not given in perception; and, third, the object known or the transcendent, which is 'in,' as known, and yet 'beyond' the meaning, forming with it a differentiated unity. The transcendent is known, then, as a necessary term in the alogical relations of scientific knowing; with its distinctive characteristics of permanence, independence, causal regularity and difference in kind it constitutes the ground for the validity of knowledge.

Finally, this transcendent manifold, which, together with individual experience may indifferently be called an 'absolute,' but is not therefore to be considered as homogeneous, is not only the fundamental condition of successful alogical knowledge but also the origin of the need of success.

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Image, Idea and Meaning. R. F. A. HOERNLÉ. *Mind*, 1907, XVI., 70-100.

"There is no idea . . . which is wholly meaningless. An idea always carries with it a relation to something other than itself. . . . Even 'square circle' is not meaningless. . . . This refusal of the elements to be joined is an experience as distinct and definite in its way as the experience of the blending of 'equilateral' and 'triangle' (p. 75). "In ordinary thinking our attention is not directed towards or even mainly to the ideas but primarily to their meanings. And it is only when we fail to understand, that the idea itself (the word or image) becomes prominent in consciousness" (pp. 75-76).

Both the idea and the meaning, Hoernlé says, must be presented to consciousness (p. 76). Lipps says the whole is perceived but only some parts of it are apperceived. Bosanquet says that in the logical use of the idea part of the meaning as well as all of the existence of the idea is crushed out. So Bradley. James says that the meaning is the fringe of the idea. But this just reverses what introspection reveals to us, viz., that the meaning is the focal thing in consciousness except when for some reason it fails us, when we bring the image into the focus for the sake of more adequately getting the meaning.

Hoernlé holds that the meaning is a peculiar element which ever

eludes introspection and thus description, and that therefore the consciousness of the meaning of a thought is never identical with the consciousness of the word or image or other sensational element which serves as the sign or cue to the meaning. Meaning, he says, can never be pinned down, and the same is true of feeling. For this reason he opposes James' analysis of emotion into organic sensations and his analysis of the activity experience into kinæsthetic sensations. The experience of 'love,' for example, is something more than what you find in your consciousness, the sound of the word, some definition that might occur to you, etc. All introspection reveals is the empty shells which contained the meaning which has fled (p. 78).

But Hoernlé gives no explanation of what this peculiar element is or what is meant by its elusiveness. He cites with approval James' reference to it as the transitive phase of consciousness, as opposed to a substantive phase of which an image would be an example. But he does not work out the implications of this idea of transition, and this may have something to do with his deliberate abjuration of all metaphysical issues in his discussion.

What is the meaning which as such never comes to consciousness and yet which somehow maintains the unity and continuity of the experience, but the fact of habit? And what is the significance of its elusiveness except that as long as it is functioning adequately there is no occasion for its being brought to consciousness, whereas, when it is brought to consciousness by reason of its inadequacy as habit, that very fact involves its transformation into something else (image) in order to make it adequate. Meaning, accordingly, never comes to consciousness as such, because when quite adequate as meaning it is perfectly habitual or automatic. If it be objected that this is just what one would regard as a *meaningless* experience, if it is insisted that meaning must be conscious, then the relatively adequate or *meaningful* experience would be the emotional experience which represents the culmination of the reflective process. What is in consciousness at the moment when as in ordinary experience we are conscious of the object (rather than as psychologists, conscious of the image) is that feature of the object or situation which is the handle to all the rest. The consciousness of meaning, therefore, must be in terms of image of some sort, though it may be so vague and total in character, so suffused by emotion and so imperfectly articulate, that it would not be readily identified as the same in function as the more clearly describable image of the psychology books.

Meaning would thus be simply the image, the idea, at work in successfully controlling the situation, and the apparent negligibility of

a great part of the imagery, the crushing out of part of the meaning, as Bosanquet puts it, means not that it is not functioning as part of the meaning of the object or situation, but that it is irrelevant and so taken for granted in the specific situation. The fact of its being ignored may signify simply that it is so adequately playing its part as meaning that it need not be in the focus or even in the fringe of consciousness.

Hoernlé cites the account of the way in which Helen Keller first came to know that 'w-a-t-e-r' meant the wonderful cool something that was pouring over her hand, and makes a point of the fact that she had been able, even before this first consciousness of meaning as such, to associate words and acts, words and objects, words and situations. The implication is that at this point some peculiar element is introduced which was not there before. But does this signify anything more than that up to that time she had experienced meanings in connection with specific situations and had perhaps established certain meaning-habits in relation to such situations, but that now for the first time these intellectual habits come in to reinforce each other?—hence the glow of happy wonder with which she originally felt and subsequently recalls this experience: it meant a wider and firmer control of experience.

Such a psychology of meaning and of image in relation to habit would render unnecessary Hoernlé's mystical appeal to a peculiar elusive element and the resolute stand which he feels he must take on the self-transcendence of consciousness (p. 81). It is quite true that in knowledge I not only have an idea but that the idea is of something, but the only condition in which I am compelled to distinguish the meaning (the 'something') from the idea (the image) is precisely an experience in which I am not adequately getting the meaning, the 'something,' so that the distinction between the idea as image and the idea as meaning is a bifurcation which takes place within the knowledge process or consciousness and in no sense involves a self-transcendence.

Thus the truth would lie in the very doctrine which on his theory must be rejected, namely, that the meaning of an idea is to be found in the other ideas (p. 83). If images are just habits coming to consciousness for reconstruction, then the meaning of any particular image lies just in the process of mutual interaction and reorganization of these images (of these habit systems). An idea, as Professor Dewey says, is any mental state which is used for the sake of referring easily and fluidly to *any* object in *any* phase, thus freeing and facilitating our intercourse with things. "The idea as purely psychical is the object in solution, moving towards re-precipitation in some object which is more

anticipated, which thus satisfies more, and hence has increase of meaning" (*Journ. of Philos., Psy. & Sci. Methods*, March 31, 1904). Ideas are simply 'a more adequate methodological device for facilitating and controlling knowledge—that is to say, acquaintance and transactions with objects.'

Any experience in so far as it subserves this function is an idea, and apparently there is no experience which under suitable conditions may not thus serve as the handle for getting hold of other experiences, a means or instrument or intermediary to other situations.

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La logique avant les logiciens. A. CHIDE. *Revue philosophique*, 1906, LXII., 160-185.

The author undertakes to determine by means of a study of primitive language and the manner of its formation what is the character of the natural and universal processes of the human mind in reasoning. The specific question is whether the Aristotelian form of reasoning by the subsumption of concepts is the primitive and universal form. The theory of roots by which the earlier linguistic scholars explained the growth of knowledge was conformable to the hypothesis that this was the primitive form. On this theory language is held to have started with a few simple forms and to have attained its present complexity through the addition of the various endings in declension, conjugation, etc. This theory the author opposes on purely linguistic grounds, calling attention to the fact that it has been rejected by more recent scholars. This theory of roots implies an accompanying evolution of thought from primitive simple forms by increasing discrimination and differentiation to its present complexity. The author holds that on the contrary the development has been from early manifold and complex forms of thought and speech through gradual generalization and the formation of concepts to the present simplified logical processes. These are late products of thought and not mere transcripts from experience. To assume that these logical processes are characteristic of the most primitive thought is to impose upon the facts the results of centuries of development. There is abundant linguistic evidence which goes to show that many other relations had an earlier existence than that of subsumption, as for example the relation of quantity, the categories of number, unity and plurality, space and time, the distinction between subject and object, the sexes, etc. Therefore, the relations underlying formal logic cannot, he concludes, be primitive and universal forms of thought.

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THE
PSYCHOLOGICAL BULLETIN

THE PHYSICAL BASIS OF CONDUCT.

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My purpose in this paper is to consider the question as to what is the character of those physiological processes and structures, which, found within the living organism, form either directly or indirectly the basis of conduct, or, stated more generally, it is to determine the relation which these organic things and events bear to inorganic. Now I am quite aware that there are positions which at least seem to differ very much from the one herein developed, and that which I find to be their common characteristic is the insistence on the point that there is a very considerable group of organic phenomena, found, for example, in the processes of secretion and absorption, of development and regeneration, that can neither be 'reduced to' nor 'built up from,' at least step by step, the physical and chemical phenomena of which we have such an exact knowledge elsewhere. Yet it is clear, that, before such a position or any conclusions based upon it can be admitted, it is necessary not only to determine just what is meant by 'reduction' and by 'building up,' but also to consider if it is not possible, upon the experimental basis on which we now stand, and by means of certain methodological principles, to say just how different the organic is from the inorganic realm, and whether it is determined teleologically, etc. It is this program, then, that I purpose to carry out in this paper.

Accordingly, although at the risk of offering the trite, but yet because it is necessitated by the character of my argument, I begin with the consideration of some points concerning those laws which are uniformly accepted as valid for inorganic phenomena.

These laws, I find, can be divided into two classes, namely, those, on the one hand, which are *general* or *fundamental* in that their

'essential characteristics' are just those which are common to, on the other hand, a group of *more specific* laws, which can accordingly be called *empirical*. Concerning both kinds of laws four questions can be asked: (1) What are they? (2) What is their relation to each other and to concrete phenomena? (3) Are all, or only some of them valid for the organic realm? and (4) Are there, *besides* these, also special organic laws?

To answer question (1). First, there are *four general and fundamental laws* which, as stated in one form or another, are accepted for all physical or at least all inorganic events. That they are also valid for all organic events and qualities I purpose showing. I shall present here only those details which are required for the construction of my argument.

There is the First Law, that of the *conservative* of energy, which may be stated: In an isolated system in which events are occurring the energy-quantum remains constant.

A *system* consists of a number of energy-quanta of different forms coexisting within certain spatial limits; this may be regarded as a *mechanism*, which is not the same as saying that it is explainable by, or reducible to, *mechanical* principles.

The *process* taking place in a system will consist in the change of a definite quantum of one energy-form into that of one or more others. This constitutes *transformation*, the conditions for which are stated only by the generalized second law, but which itself here leads to the second statement of conservation, namely, that

In all energy-transformations the quantum of one form disappearing is equal quantitatively to the total quantum of the other forms which appear.

This gives the *first constituent of determinism*, the demonstration of which is the first point in my argument; it demands that there can not more happen than there is sufficient cause for; there is a *singularity* of effect.

The criterion of that which shall be regarded as a new energy-form is that it is such a quantity as will produce the same effect quantitatively as that which is already accepted as energy, namely, heat and motion. Accordingly, let the claim for a vital energy be advanced; then this must stand the test of this equivalence-transformation criterion, so that, with positive results, such a new energy would be subject to the same general principles of 'mechanism' as are the other energy-forms.

The Second Law states the *condition for transformation*. According to it, in its generalized form, each energy-form is the product of

two factors, an extensity or capacity and an *intensity* or *potential*, these of course, being different in different species. Secondly, and most important, it is in virtue of intensities that events take place; here there is *another deterministic element, the second*: Two intensities may be opposed and meet, as it were, at a common point; they must, too, be either equal or unequal. With the latter the case, *i. e.* with a difference of intensities existing, and with no third intensity present to supplement the lesser one, *i. e.* to *compensate* the difference, an energy-transfer, *an event*, must take place in the *direction* of higher-to-lower-potential until equilibrium is reached. Thus the principle of efficient causation receives exact formulation, constituting the 'law of events.'

The Third Law, entropy. Since most, if not all events, are exothermic, since, too, because temperature (heat intensity) can not be compensated, heat spreads out or is dispersed, and since, as it does this, the condition of a uniformly equal temperature is approached to, there results a *third constituent of determinism*; natural events have an *irreversibility*, a *definiteness of direction*; the entropy of the universe increases.

It is important, also, that this law, in some of its features, is derived from the Second.

That which may be regarded as the Fourth Law, determinism, is, as has been indicated, derivable from the three preceding: Conservation gives singularity, uniqueness of determination; by a cause one and only one effect, namely, that which is equal to it quantitatively, can be brought about. Likewise the Second Law; according to it there is only one effect, namely, that which, as the total rise of one or more intensities, is quantitatively equal to the fall in that intensity which is cause. And it has been seen that the Second and the Third Laws mean a definiteness of direction, an irreversibility in events. These and singularity together constitute *invariability* or *determinism* in the events taking place in any system or mechanism.

The First and Second Laws, and, accordingly, the Third and Fourth by virtue of their derivation from them, can all be expressed in their generic form by an epitomizing formula¹

¹The derivation of this formula I have shown in my paper, The Energy of Segmentation, *Jour. of Exper. Zoölogy*, June, 1907. In it, W signifies the external work produced by any reversible change taking place in any system at a constant intensity, I ; $U_2 - U_1$ is the accompanying change in the internal energy of the system; dW is the increase in the quantity of work produced when the same change in the system takes place at the intensity $I + dI$; dW/dI is the potential coefficient, I the intensity; the resultant change in the energy of the system is the product of the two.

$$W + (U_2 - U_1) = I \frac{dW}{dI},$$

which can be demonstrated to stand in the relation of genus to a certain class of empirical laws, namely, specific energy-laws, as species. This fact is of great importance for our subsequent considerations.

According to the above principles then, *every event in the physical world is really identical with an energy-transfer under the conditions stated*; and each energy-form is the product of an intensity and an extensity, *i. e.*,

$$E = ic.$$

However, since usually only the changes in, and not the absolute quantity of, the energy of a system can be measured, the differential form of this equation,

$$dE = d(ic) = idc + cdi$$

is more generally applicable.

Then $dE = idc$ when i is constant, and cdi with c constant.

Attention is drawn to this point to make clear what the ultimate purpose of empirical investigation *may be*. In general this can be said to be that of determining dE in any way possible, but as the change, always, of some specific energy-form.

In some cases, now, this end can be attained *directly*; the energy-change can itself be measured. With this done, and with it at the same time also possible to measure the absolute value of one of the factors, it is evident that, should this also be desired, the value of the change in the other factor can be computed; or, conversely, with the *change* in one known, the absolute value of the other factor can be found. In other cases, however, the energy-change can be determined only *indirectly* by measuring both the absolute value of one factor and the change in the other.

Indeed the fact of these possibilities makes it evident that the purpose of empirical investigation may be twofold, namely, to get directly or indirectly, as the case may be, *laws*, which will express either (1) the *transformation* of an energy-quantum of one kind into that of another, or (2) the *functional relation* (*a*) between the two factors of the same energy form, or (*b*) between the intensity factors of different forms, or, finally, (*c*) of constituents of such factors.¹

¹ Examples: (1) $U_2 - U_1 = Q - W$; (2) (*a*) $p_1 v_1 = p_2 v_2$; (*b*) $dp/p = dT/T$; (*c*) where, for surface energy, $dE_s = \gamma ds$, and $\gamma = \frac{1}{2}grhD$, these last are constituents.

Whatever now the term may be that would best characterize and distinguish these last three from the distinctly energy-laws, I for that purpose shall call them functional, descriptive or empirical; and furthermore I wish to insist on that which is perhaps quite clear, but yet important, namely, that they can usually be made constituents of energy-laws, and accordingly must in this sense be in thorough accordance with these.

These facts have been presented in order to make evident what is the character of the relation which the Four Laws bear to empirical laws and to concrete phenomena. However, with regard to this, two positions, *each conditioning a typical and a distinctive view as to the nature of organic phenomena*, can be found and must here be stated.

One which I designate α is, that, while admitting the Four Laws to be at least predominantly quantitative, they nevertheless express the common characteristics of the series of specific energy-laws and thus ultimately also of concrete phenomena — for these are energy-changes — so that there results a natural classification, with the Four Laws, or the equation epitomizing them, as highest genus, with concrete events as *infima species*, and with specific energy-laws as intermediate concepts. Accordingly, the characteristics formulated by the Four Laws extend, in all their aspects, both logical and alogical, down and through the empirical laws and become *incorporate* in the concrete phenomena so that these are simultaneously and cospatially both quantitative and qualitative. It is this view which is indicated, I believe, by practically all the considerations which bear on the question, to be correct one, and this it is accordingly that I purpose to support.

The second position, β , diametrically opposed to this first, is that the Four Laws *are not thus incorporate*; they are interpreted as not touching, or, better, as not affecting the qualitative side, but rather as expressing *only* the quantitative aspect; this, therefore, is regarded as existing simply *side by side* with the qualitative, but not as ‘penetrating it.’

However, the reason why this position is held becomes evident by considering the use which is made of it, and is shown clearly to be an ulterior one. In those who maintain it the *conviction* is strong that organic phenomena are very fundamentally different from inorganic, that accordingly they have their own distinctive qualitative laws and may be characterized by the presence of a teleological element. The opportunity is then sought, while holding this position, and interpreting the teleology as contradictory to determinism *formally*, to avoid at the same time any contradiction with it *realiter*; and it is by making

this second interpretation that this opportunity is believed to be found. For, with it a fact that some, perhaps even many, of the phenomena in the organism are different from those in the inorganic realm, it is argued, that, if this qualitative side be not affected by the Four Laws with their determinism, there will be found room in it for the operation, not only of distinctive, qualitative organic laws, but also, without *concrete* contradiction with determinism, of a teleology.

Yet, that this attempt is really successful, is, I think, open to much doubt; but it has the value of indicating rather clearly the point around which our problem turns, namely, *the relation which one law may have to another*. It is to the consideration of this, then, that I now proceed. Of such relations I find that there seem to be three possible cases:

(a) There is first suggested, as an exaggerated analogy of the above second position ' β ,' the case of two laws applying to concrete phenomena which are widely separated in time and space; then these laws might of course be different, very different; in fact it might appear and even be claimed that they could be so different as to have reached that degree of difference which, as stated *formally*, is *contradiction*, and yet that this, in virtue of the remoteness of the things to which they apply, would not carry with it a contradiction *realiter*. However, such a remoteness could, I think, not long be maintained; sooner or later, either through their implications or because ground for their application *within the same complex* might apparently be found, the two laws would be brought into 'contact' at or 'penetration' of that which can theoretically be regarded as the same point. That point, then, would, by assumption, be determined simultaneously in two *divergent* or *opposed* directions, *i. e.*, a *contradiction realiter* would be generated. The supposition then that the two laws could be so different as to be contradictory is shown to be impossible; then we must infer either that they must be contraries and as such have certain characteristics in common so that they will be subordinate to the same general principles, or that they must have the relation to each other of genus and species. In the first case their determinations would be regarded as running *parallel* and in the same direction, and not as opposed or divergent; in the second, they would coincide, *i. e.*, those of the genus would be incorporate in those of the species. The former leads us to

(b) Two laws, coördinate with each other, may be valid within the same system, and apply to different processes. Their determinations of these processes will then run parallel and in the same direc-

tion, while that of the system as a whole will be in accordance with those more general principles to which the specific laws are subordinate. The two laws, then, will be valid side by side, parallel to each other; they will be different, but, again, not contradictory.

(c) But, given what are supposed to be two laws or principles, and grant that they actually or seemingly apply to *one and the same process*. What can their relations be? *Three* cases can be distinguished: (1) The two might prove to be contradictory; *i. e.*, the attempt to apply them to the same process might disclose that they respectively assert and deny the same property or character in that process; for it is just this condition of 'penetrating' the same point or process that generates a contradiction *realiter*. Then both can not be true; and the attempted application of one will have failed; or (2) the two might be laws or expressions for incorporate aspects of one and the same process; as such they might prove to be constituents of one and the same law holding for the process as a whole. Then they are perfectly compatible, in no case contradictory; or (3) between the two laws there might be the relation of genus and species, of subordination one to the other; then the determinations of the one would not run parallel to those of the other, but, rather, the genus would be incorporate in the species and both in turn incorporate in the concrete process. Although different, as stated formally, the two are, of course, quite compatible.

The purpose of this analysis has been to prepare the way for the consideration of the question: If a teleological principle were accepted as operating in organisms, under which one of the above cases is the relation which it bears to mechanistic determinism to be placed? However, it is very evident that the answer to this would depend on the interpretation or definition given to these principles, just as conversely, these would depend on the place in the scheme in which they are put. But we may try the placing of them in each of the different cases and draw our conclusions.

Thus, first, suppose determinism and teleology to be two distinct and approximately coördinate principles, corresponding to simply two different laws as in case (a) or, since (a) leads to (b) suppose, preferably, as in (b), that the two apply to different processes in the same system. Then this supposition demands that view of the relation of the Four Laws to concrete phenomena which was called ' β ', *i. e.*, that the mechanistic determinism which these laws imply hold only for a quantitative side or process, the teleology for a qualitative. But our

scheme then demands that the two should not be contradictory; that they should have some generic features, that their determinations should be parallel and in the same direction. Accordingly, the teleology could not be interpreted in its usual way, namely, as meaning that variation of means to an end which is contradictory to determinism, so that if the term be still retained, its meaning must be modified.

However, this supposition that mechanism and teleology are two distinct and possibly coördinate principles must be given up, if, instead of accepting position ' β ,' the 'first' interpretation, ' α ,' that the determinism is incorporate in the qualities, be postulated. For then the *determinism must apply to the very same process as does the teleology*, and accordingly we get the following possibilities as given by case (c) :

Either, (c) (1), the determinism and the teleology are contradictory *realiter*; *i. e.*, that formal contradiction which appears from interpreting the teleology as asserting a variation of means to an end, and the determinism as denying this, becomes one *realiter* when it is necessary to apply both to the same process. Then both can not be true, and the establishment of one is invalidation of the other; accordingly, either this must be given up, or, if the term be still used, this can be done only with a modified meaning. Thus, (c) (2), if the determinism shall have been proved for *all* processes within the system and so for the system as a whole in all its aspects, qualitative as well as quantitative, and if it still be insisted that there is a teleological determination for the system, then this can be interpreted as meaning only some such thing as *accumulation* or *progression*, etc., but not as variation of means, and the two principles would express incorporate characteristics of one and the same process or system and might be either constituents of the same law or one be a species to the other as genus. However, this last relation would come under (c) (3) according to which determinism and teleology must be not only quite compatible, but one, say, the latter, must prove to be a special case of the other; thus teleology might, as species, be quite deterministic and yet be genus to a certain group of distinctly empirical yet completely causal organic laws.

Can, now, a thorough-goingly deterministic position, one which will, without exception, apply to *all* phenomena within the organism, be established? I believe that it can, and, accordingly, to do this is now my purpose; for, with this accomplished, our scheme will enable us to decide as to both the existence and character either of a teleology or possibly of other specific organic laws.

The two opposed positions concerning the relation which the Four Laws may bear to the qualities have already been presented. I shall begin my argument for determinism at this point, then, with some considerations as to the *qualities* themselves. That term I use here in perhaps rather a broad sense, equating it with *character* or *property*; but the meaning which I attach to it may be indicated by the statement that it is by the qualities or properties that the bodies and substances which we perceive and know are made up or constituted. For there concern us here, first, the three categories of existence, things, events, and relations, and then, fourthly, that by virtue of or in respect to which any of these may differ or be similar among themselves, namely, qualities.

But 'things' seem to have a precarious existence; they change, either slower or faster. But changes are energy-transfers; so I will let *thing* = *system*, as I have previously defined it.

Now a system, or 'whole,' implies 'parts,' but as to what is regarded as 'whole' and as 'part' differs not only with different sciences, but also, within any one science, both with the period in its development and with the immediate purpose in view.

However, whatever be the system which, for the time being, is regarded as *the* 'whole,' and however its qualities and properties be perceived, there is one principle which I find to be operating in all cases of 'whole and parts,' the principle, namely, which I call "creative synthesis." Its presence and 'working' can, I think, be demonstrated as follows:

Whatever may be the qualities which a system has as a 'whole,' *i. e.*, whether they be processes, or qualities in the narrow sense of the term, there is always a division which can be made among them. For, on the one hand, there are some of them which are the same as those characters which the 'parts' or 'elements,' whatever for the time being may be selected as such would have or retain if isolated; these accordingly give an *additive* result in the 'whole.' On the other hand there are other properties which are not to be so derived (additively), and it is here that the important principle of '*creative synthesis*' appears. All *non-additive* characters can and must result only from the coöperation of 'parts' or 'elements' which, when isolated, have characters different from those that are evident when a 'whole' is formed by their coëxistence. The 'parts' *determine, cause*, the appearance of the qualities, and the qualities are new; in some sense they now exist where before they did not. This principle is operating when electrons coöperate to form an atom, atoms molecules, and mole-

cules a particle, etc.; indeed it can be shown to be quite as valid if it be insisted that there are 'secondary' qualities as opposed to so-called 'primary'; to do this it is necessary only to bring the perceiving subject into the 'system.'

Now, it is the recognition of this principle that makes it possible to give a definite statement as to what constitutes 'reduction,' and thus both to answer one of the questions raised at the beginning, and to make the next step in the demonstration of determinism:

Given that which is for the purpose in hand selected as the 'whole,' and letting its 'parts' also be known, say either as atoms, or as ions, or as molecules, or as constituent energies, then the qualities and properties of each of these may be enumerated and laws, of some kind, — what, we shall see, — may be given. For there are three cases:

1. In some instances it will be found that the qualities of the 'whole,' let this be either a body or a substance, result *additively* from those of the 'parts';¹ the former may then be said to be 'reduced' to the latter. This additive method constitutes 'reduction' of the *first kind*. Concerning it two statements must be made; first, if *all* qualities were additive results, then all the physical sciences could adopt a simple computative, perhaps purely deductive method, and secondly, with determinism valid for the 'parts' it would also be for the 'wholes,' and conversely.

However, in a great many cases additive derivation is not possible; and the evidence shows that this is *due, not to our ignorance*, but to the peculiar way in which the 'parts' work together. It is here then that 'creative synthesis' is operative.

Again, such cases fall into two classes. Common to both of them are the facts, first, that, some body or substance having been selected as the 'whole' or complex to be investigated, descriptive laws, coefficients, etc., of the properties of this as a 'whole' can be found and second, that it will be known that such a 'whole' is made up of certain 'parts,' *e. g.*, ions, atoms, specific energy-forms, etc., the laws of

¹ Examples of such additive results could be given almost *ad infinitum*; I content myself with giving some typical ones from the strictly scientific field; thus, 'specific refractive power,' 'specific absorptive power,' 'specific rotary power' of a salt-solution are the additive result of those of the ions; likewise 'specific volumes,' 'molecular heats,' and the pressures of gases or of substances in solution are additive. In all such cases an empirical law, descriptive of some property of the 'whole,' can be found, independent of any similar law for the part; yet when this latter is also obtained, the two are found to be related additively.

whose properties and behavior are also known, but yet that such properties are not the same as those of the 'whole.'

2. But at this point the division begins; for, with so much known, it is possible in *some* cases to discover, although only empirically, an exact functional relation, constant within certain limits, between certain laws of properties of the 'whole,' and those of the 'parts.' Such a 'connecting law' is really a law of the synthesis; its importance here is that it gives a second meaning to the term 'reduction.'¹

(3) In other cases *no such functional relation* is discernible; at present we must content ourselves with laws of the 'whole,' and of the 'part,' but without connecting them empirically. 'Reduction,' even of the second type, is not possible.² Shall there be inferred, then, from this lack of 'reduction,' either a permanent irreducibility, or an indeterminism of the qualities of the whole? The question is especially pertinent, since most of our present knowledge of the organism, as found in physiology, histology, and embryology, etc., is of this third type.

For, on the one hand, it must be granted that there are present in the organism as a 'whole' certain qualities and processes which are found nowhere else; it must be admitted, then, that these distinguish the organic realm from the inorganic and may be regarded, in some of their phases at least, as specifically organic characters. But, on the other hand, that just this should be the case, our principle of 'creative synthesis' makes quite intelligible, quite probable. For the organism is a complex, a 'whole,' made up of 'parts' — let them be the atoms or certain ions or the colloidal particles, — which, taken singly, *are found* elsewhere, but which *taken together* are found only in this

¹ Examples of this are: (1) Kinetic theory of gases, according to which the temperature of the whole is functionally connected with the motion of the parts; here *the fact is* that temperature and motion are not the same thing. (2) The *color* of bodies can *likewise* be closely connected with the absorption of light and this in turn with certain atomic phenomena. (3) Increased pressure of 'dilute solutions' as a function of *number* of ions. (4) Optical activity (rotation of planes of polarized light) as a function of spatial position of atoms in the molecule. Finally, I think, all so-called 'reduction' of other qualities and properties to those of the attraction and repulsion and resultant motion of mass particles is of this kind.

² Examples of this class could also be given in almost indefinite number, but a few chosen at random suffice: — crystal-melting-points, coefficients of elasticity, of surface tension, of expansion of metals, condensation point, etc. These can be found both for compounds and for constituents. Now, we are not able to make use of the 'conceptual model' constructed by the aid of elementary corpuscles with ideal motions. Much of the behavior of the lower organisms, as described by Jennings, for example, falls in this class.

special complex. And since the qualities of such a 'whole' result, some few of them additively, others by 'creative synthesis' from those of the 'parts,' then, so far as the last is the case, the qualities of this complex must be those which will be found in no other complex (inorganic). And so far as these qualities or some of them can not *now* be 'reduced,' in either sense of the term, all that can be done, though even this forms the first step in 'reduction,' is to study the qualities of the 'whole' directly and by themselves, and, if possible, get empirical, descriptive laws for them. In this respect, the position — sometimes taken — that the organism itself is the only useful unit for biological study is justified.

But this admission does not warrant or allow an evasion of the question as to whether physical laws, all or only some of them, are valid for the organism. To this the first answer that can be made is quite evident from the principle of 'creative synthesis': Those physical laws which are descriptive laws of inorganic 'wholes' or complexes are limited to these unless such 'wholes' are themselves found in organisms and give additive results; however, in general, such laws are no more valid for 'organic wholes' than, conversely, the peculiar laws of the latter are for the former. And, secondly, so far as certain parts, certain chemical elements, etc., are not among the constituents of the organism, it is evident that their specific laws have no application to it.

But, on the other hand, it is a matter of well authenticated knowledge that the organism, or its unit, the cell, is made up of the atoms of certain elements, these atoms constituting an energy-form of a very specific character; and the presence of other specific energy-forms is also established. Furthermore, these constituents, when isolated, are known to follow definite specific laws, either themselves 'energy-laws,' or constituents of these. But these have been demonstrated to be subsumable under the Four Laws, so that, conversely, the determinism which they imply is incorporate both in the specific laws and, finally, in the concrete phenomena to which they apply; for concrete phenomena, at the same time that they are qualities, are also quantities. The qualities are, therefore, completely *determined*.

Accordingly, it must be granted, in agreement with general methodological principles as to the 'extension' of a law and as a matter of consistent procedure, that, when the atoms of certain elements and a number of specific energy-forms coexist in a certain complex, all the laws for these, generic (like the four) as well as specific, are still obeyed. Indeed, there would be no question as to this were all the qualities of such a complex or 'whole' derivable additively; then, the

laws of the 'whole' would be derivable in like manner from those of the 'parts.' But no more should there be a question as to this validity when it is found that this additive derivation is limited, and that 'creative synthesis' must be brought in that an account may be given of *the appearance of new and distinctive qualities*. For, whether these can be 'reduced,' in the second sense of the term, to the properties of the parts, or not, in neither case can any reason at all be given why the fact of this 'synthesis' should invalidate the continuance of the 'concrete operation' of either the special or the general laws. In fact, for inorganic complexes it is accepted that there is no such invalidation. Then, I hold, — and this is perhaps one of the most essential points in my argument — *consistency* demands that the same position should be taken for organic complexes; *here* there are quite the same reasons — no more, but certainly no fewer — for it as *there*; the only difference is one of constituents and the arrangement, etc., of these within the complex. Consistency demands, then, that, in the view which we take of the results of the investigation of organic phenomena, we should adopt simply the same principles of procedure and of interpretation as are accepted for inorganic. For then, and then only, can the character of the relation between the two realms be equitably stated.

This brings the result, in both cases, that, just as the relation of the Four Laws to the specific laws and to concrete phenomena implies a determinism for them when taken singly, or together additively, so will that same determinism be quite as valid for them and the distinctive and new qualities which they produce when working 'synthetically.' For these qualities, as qualities of the 'whole,' there may be discoverable — as I have pointed out — laws, descriptive and even specifically organic.

But these laws, by virtue of the origin of that of which they are laws, will be subsumable under the same principles of mechanistic determinism as are the qualities which, though *new*, are yet, like those of the 'parts', quantitative as well as qualitative.

The meaning of all this is, of course, a complete and thorough-going determinism for all processes and qualities found within the organism, *i. e.*, for those both of the 'parts' and of the 'whole', and for the 'synthetic creation' of certain of the latter from the former, whether the functional relation between the two be known or not, and it was this position that I set out to establish.

Considering this attempt to have been successful, further results may now be stated as they are demanded by the scheme of the 'possible relations between two laws or principles.'

That analysis shows (c) (1) that, with determinism established for the organism both in 'whole and part', there is absolutely no opportunity for teleology, if this mean 'the variation of means to one end'; for, with the determinism holding good for all qualities and processes, the attempt to apply teleology in the above sense to any one of these makes of the formal contradiction one *realiter*. Consequently, if it still be insisted that the term 'teleology' be retained, its meaning must be modified, (c) (2). And there are, indeed, certain good reasons for so modifying and retaining it; for, on the one hand, the principle of 'creative synthesis' makes it intelligible that the organism, since it is a 'peculiar' complex, should have certain properties and processes not found in the inorganic realm, and yet that all of these should be completely determined. However, among these there might well be some, which, as indeed there are good grounds for maintaining, could best be described *empirically* as *directly preservative of both the form and life of the organism*. On the other hand, the same principle makes it easy to understand, that in both the ontogenetic and phylogenetic development there should be a *progression* in the appearance of new characters, and, in this sense, as is the case with every *progression*, an *accumulation*. The progression, at the same time that it would be quite determined, would also imply at each stage both some end previously 'made for' and the making for a more distant end in the same series.

At length, then, it is possible to answer one of the principal questions stated at the beginning of this paper, namely, as to the nature of organic events and qualities and their relation to inorganic. For the determinism which I believe to have found means that the Four Laws extend down and through — as the genus does for the species and their constituent characters — the empirical laws, both energy- and functional and descriptive, of the organic as well as of the inorganic realm, and that they finally become *incorporate* in the concrete phenomena. But the development of the position has shown that this leaves ample opportunity for the admission of the claim made by the adherents of *another*, a contrasting, viewpoint, that *some* organic phenomena can not be 'reduced to' or 'built up from' inorganic elements or 'parts,' or the laws of the former be connected functionally with those of the latter. What such a 'reduction' or 'building up' must mean has been analyzed, and the unjustifiableness of inferring the permanent impossibility of 'reduction' of the second type from its present lack has been made evident. On the other hand, that there must be perhaps such a permanent impossibility as concerns additive reduction, the principle of 'creative

synthesis' has made quite clear. At the present time, then, *some* organic phenomena are 'reduced' according to the first method, *others* according to the second, while for still others neither of these is possible, so that, for these last, the only recourse is the descriptive law, and the most expedient unit perhaps the organism, or the cell, or the nucleus, and not the atom, the energy-form, or the colloidal particle. But, at almost any time, it may be found that such descriptive laws are functionally connected with those of the atom, or of the specific energy-form. Accordingly, they *must be held to be* quite compatible with, in fact, theoretically, to be *cases of determinism*, at the same time, that, as descriptive, they may be best stated and worked out from the standpoint of the teleology as defined in (c) (2), that, namely which is conducive to the *preservation* and *progress* either of the individual or of the species. *Such a teleology* is (c) (3), not only compatible with, but *a special case of determinism* itself; it is *objective* and not subjective, *i. e.*, it demands no psychically felt purpose. In fact, the same argument by which determinism has been established, and teleology limited and made acceptable, demands, that, when there are certain events, physical or psychical, identified with *conduct*, they shall conform to these deterministic principles. The psychical teleology becomes, then, a special case of the objective.

Finally, the validity of the Four Laws for organic as well as for inorganic phenomena brings both these realms into the *same classification*, at the same time that in this the presence of *non-additive differentia* as qualities of the 'whole' is both demanded and made intelligible by 'creative synthesis.' Both the organic and the inorganic are, then, species in the same 'natural classification,' that is, the complexes or 'wholes' of the former differ from those of the inorganic realm just as the complexes within this realm differ among themselves. This, then, is the character of the relation which the organic has to the inorganic; they are related as species under the same genus.

PSYCHOLOGICAL LITERATURE.

COMPARATIVE PSYCHOLOGY.

The past year has been one of great activity so far as concerns the work upon lower organisms. Many separate research articles, and one or two important books have appeared. The present resumé cannot hope to do more than give a brief notice of the researches coming under the reviewer's eyes. Attention will be given mainly to American researches. Notice is called to the yearly reviews of Bohn in *L'Année Psychologique*. (Also see Yerkes' very excellent summary of Bohn's own experimental work. *Jr. Comp. Neurol. and Psychol.*, XVI., 1906, 231-239.)

The science of behavior is now so thoroughly established that the present reviewer feels that the time is ripe for setting aside a journal devoted exclusively to its needs. Articles on behavior now appear in the *PSYCHOLOGICAL REVIEW*, in the *American Journal of Psychology*, in the *Journal of Comparative Neurology and Psychology*, in the *American Journal of Physiology*, etc. Some even are published privately. With a journal devoted exclusively to behavior, all researches should be consolidated, and such a consolidation is to be devoutly hoped for. It is becoming more and more difficult to give the oncoming student immediate orientation in the contemporary research work. Such a journal, supplied with a monograph supplement series would undoubtedly be successful from a financial point of view, if four or five of the leading universities would agree to subsidize it and to publish all research on animal behavior therein.

THE BEHAVIOR OF LOWER ORGANISMS.

Behavior of the Lower Organisms. H. S. JENNINGS. The Macmillan Co., 1906. Pp. xiv + 366.

Jennings has consolidated his own many experimental and theoretical papers in book form. The volume under review represents the printed form of his lectures as given at Columbia University. The book as a whole is very much better written as regards clearness and style than the Carnegie volume previously reviewed in this *BULLETIN*.

The book is concerned mainly with a discussion of the behavior of lower organisms as determined under conditions of control. At the

end of the experimental division of the book, he attempts an analysis of the factors entering into the behavior of lower organisms. He emphasizes, as in his previous work, the importance of internal factors (changes in physiological state of organism) in the determination of causes leading to new adjustments. He raises the general question as to whether the behavior of lower organisms can be completely expressed in terms of reflex and automatic acts, answering the question in the negative. The reviewer does not wish to be considered as taking a position hostile to Jennings, yet it seems to him that the author in this work is taking a very narrow and mechanical view of human reflexes and automatic activities, and the extent to which they are dependent upon and are modified by the changing physiological state of the organism as a whole.

Unfortunately, Jennings, while not a psychologist, has nevertheless in this volume wandered off into the green pastures of the psychologist (and has even nibbled at the stubble of the philosopher)! He was not content to allow his experimental facts to stand as facts, but must needs raise the question which stands (needlessly) as the *bête noir* of the student of behavior. Are the lower organisms conscious? Or, to phrase it from the objective standpoint, "Do there exist in the lower organisms objective phenomena of a character similar to those which we find in the behavior of man?" Jennings gives an affirmative answer: "So far as the objective evidence goes, there is no difference in kind, but a *complete continuity between the behavior of lower and of higher organisms*" (italics ours). Jennings then goes on to say that "no statement concerning consciousness in animals is open to verification or refutation by observation and experiment." . . . "All that experiment and observation can do is to show us whether the behavior of lower organisms is objectively similar to the behavior that in man is accompanied by consciousness. If this question is answered in the affirmative, as the facts seem to require . . . then it may perhaps be said that objective investigation is as favorable to the view of the general distribution of consciousness as it could well be." It is at this point that we must raise the question which is fundamental to our science. Have we any other criterion than that of behavior for assuming that our neighbor is conscious? And do we not determine this by the complexity of his reactions (including language under behavior)? Complexity in conscious content is always accompanied by complexity in adjustment. This idea is the basal one in functional psychology. If my monkey's adjustments were as complex as those of my human subjects in the laboratory, I would have the same

reason for drawing the conclusion as regards a like complexity in the mental processes of the two. Nor would my opinion 'then be largely dominated by general philosophical considerations drawn from other fields.' My inferences would alike in the two cases be based upon observed *facts* of behavior. Jennings has not shown, nor has any one else shown that the behavior of lower organisms is objectively similar to that in man. To make the reviewer's position clear, Jennings' statements concerning the presence of perception in lower organisms may be cited. "When we say an animal *perceives* something, or shows a perception of something, we base this statement upon the observation that it reacts in some way to this thing. On the same basis, we could make the statement that *amœba* perceives all classes of stimuli which we ourselves perceive, save sound (which is, however, essentially one form of mechanical stimulation). Perception as judged from our subjective experiences means much more; how much of this may be present in animals outside of ourselves we cannot know." The flaws in Jennings' psychology are surely patent to every student of experimental psychology. Is simple reaction to a stimulus the only *objective manifestation* of perceptual behavior in man? Certainly not! There are hundreds of others beside the overt movement of the voluntary muscles which can be directly observed, such as eye movement, convergence, accommodation, changes in respiration, circulation, changes in tonus of musculature, etc., and still others which can be inferred, as concerted reaction between different cortical systems; cortical 'retention' of the modifications of past stimuli, etc. It is the task of the experimental psychologists to refine upon and to add to this list of objective manifestations of the perceptual act. So far as we know, some such complexity in adjustment is *necessary to every perceptual act*. If we may be allowed to call introspection in at this point, we find that it everywhere supports our contention that where you have complexity in content you likewise have complexity in adjustment; if subjectively to the human 'experiencer' there is more than simple reaction towards a stimulus in a perception, objectively there is more there too. If Jennings would show that the adjustments of the *amœba* to a sensory stimulation were as complex *from the objective or behavior standpoint* as our own adjustments to a like stimulus, we would not only be willing to grant him that his *amœba perceives* but also we would be forced to make the assumption for the very same cogent reasons that we assume that our fellow man perceives.

The same lack of psychological analysis is to be found in Jen-

nings' assertions that lower organisms behave as though they consciously discriminate, and that they react as though they had representations.

From the standpoint of the contribution of facts, the book is exceedingly valuable. That portion of the book dealing with the analysis of behavior has a somewhat doubtful value because of its vagueness and complexity, and its constant allusions to pleasure and pain and to other psychical processes in man. The final chapters dealing overtly with the relation of the behavior of lower organisms to psychic behavior should be undoubtedly greatly modified when the book comes to a second edition.

J. B. W.

The Dynamics of Living Matter. JACQUES LOEB. The Macmillan Co., 1906. Pp. xi+233.

It is with a good deal of hesitation that we review this book. When a psychologist attempts to read the writings of Loeb, he is apt to become thygmotactic and stereotropic, and lose that calm intellectual poise which he ordinarily possesses. But inasmuch as Loeb in all his papers is constantly attacking the psychologist, whom he calls the metaphysician (he has not yet learned to make the distinction between modern psychology and modern metaphysics),¹ and since his writings are read widely by biologists, it behooves us for the sake of the young biologist to say a word in our own defense. It is all the more imperative to do this now, because the relations between the students of comparative psychology, and those of biology are becoming closer and closer. And if peace is to be maintained, there must be a certain breadth of mind on both sides, and a certain mutual insight into the principles of each other's science. What is still more important, and this is what Loeb especially ignores, each side must recognize that the fundamental metaphysical assumptions of the other are different; matter, force, energy, etc., on the one hand, mental processes, simple and complex on the other. In Loeb's book, he gives us to understand that he will have given an ultimate explanation of life when he shall have ruled out all metaphysical explanations and substituted 'physico-chemical' ones in their place.

A few sentences which certainly 'do him justice' and which lose nothing of their clearness and cogency by being 'separated from their context,' quoted from the book under review, may serve to show Loeb's wilful misunderstanding of psychology. "What do we know concerning the nature of these automatic mechanisms? *Metaphysics*

¹He is not even aware that there is a legitimate modern metaphysics.

(italics ours) has supplied us in these cases with the terms 'instinct' and 'will.'"—“An analysis of the instinctive actions has yielded the result that the purposeful motions of animals frequently depend upon mechanisms which are a function of the symmetrical structure and the symmetrical distribution of irritability on the surface of the body of the organisms”—“The will actions of animals, *i. e.*, those motions which are executed consciously, will not be discussed here as I have already analyzed them in another book. I will simply state here that I consider consciousness the function of a definite machine or organism, which we may call the mechanism of associative memory. Whatever the nature of this machine may be, it has one essential feature in common with the phonograph, namely, that it reproduces impressions in the same chronological order as that in which they are received.” But it is needless to quote further. Loeb has set up two straw-men, one ‘metaphysics,’ the other ‘anthropomorphism,’ and he is always attacking some statement under the guise of the one or the other.

On the other hand, he has raised up a fetish—that of a physico-chemical explanation of all life phenomena. He does not seem to understand that the psychologist will welcome with an enthusiasm equal to his own every advance he or any other biologist can make in the chemistry of living matter. The problems of the psychologist do not end when artificial protoplasm is made. On the contrary, were the biologist to succeed in fashioning it, the duty would be incumbent upon the psychologist to take this physico-chemically produced protoplasmic *X* from the biologist, and to test ‘him’ (pardon the anthropomorphism!) with respect to his color vision, temperature sense, etc., in short with respect to his whole sensory motor equipment. Likewise the psychologist would test him for the presence of the functions of memory, association, conception, etc. All these things and more would have to be done carefully before our experimentally produced abiogenetic individual¹ could be bottled in alcohol, shelved and labeled ‘explained.’

In the February, 1907, number of the *Journal of Experimental Zoology* (pp. 151–156), Loeb claims that Jennings and others have misunderstood his theory of tropisms and have not quoted sufficiently from his earlier works. In this paper, Loeb claims that he never said that all reactions of lower organisms take place in accordance with

¹ Loeb says (p. 223), that experimental abiogenesis is the goal of biology. With the present rate of progress in physiological chemistry, a few years ought to see artificial protoplasm. Happy science that thus sees the end of its dreams so near! I fear, however, that some hardy, metaphysically inclined biologists fail to agree with Loeb.

the tropism schema. "Those who are familiar with the terminology of the physicist will most readily understand the difference between the two types of reaction if I state that heliotropism, *e. g.*, depends upon the value of i where i is the intensity of the light, while in Unterschiedsempfindlichkeit the reaction depends upon the value of di/dt , where t is the time."

Loeb further contends that he was first to point out "that there exist types of reactions which are as different from tropisms as are quantities of the dimensions of an acceleration from those of the dimensions of a velocity. My aim was to analyze the behavior of animals from a physico-chemical point of view and substitute the methods of modern science for the anthropomorphisms of the metaphysicians." We quote from this paper because it apparently represents Loeb's latest standpoint in regard to animal behavior. It likewise shows that he still fails to grasp the fundamental principle of psychology — viz., that a physico-chemical statement of behavior can never *interfere with* nor be *substituted for* a psychological statement.¹ He fails thus to understand the basal psychological fact which we try to instill into our 'first year' students of psychology.

J. B. W.

Modifiability of Behavior in Hydroides dianthus. V. ADA WATERTON YERKES. *Jr. of Comp. Neurol. and Psy.*, 1906, XVI., 441-450.

The stimulus used to produce the reactions which were studied in these animals by the above writer was a decrease in the intensity of the light. A black card-board screen was brought down rapidly between the window and the dish containing the worms. They react to this change in the intensity of the light by a quick withdrawal into their respective tubes. After from one to three such reactions to the shadow alone, the worms usually no longer respond to continuation of this stimulation. The animals show great individual variability in their reactions to this change in the intensity of the light. Some of the animals (10 out of 27) would not respond even to the first of the ten photic stimuli (the number usually given), while others responded each time to the ten successive stimulations.

Withdrawal into the tube was produced almost invariably by touching the brachial filaments with a glass rod. The reaction to a mechanical stimulus was so much more invariable than that to the

¹*I. e.*, so long as we assume psychophysical parallelism as the working hypothesis of experimental psychology.

photic, that the investigator tried the effect of giving the photic stimulus and then immediately following this with the mechanical. When this was done, it was found that the worms responded more frequently to the photic stimulus alone than they did previous to their training, *i. e.*, they learn to react to the shadow.

J. B. W.

Death Feigning in Ranatra. S. J. HOLMES. Jr. *Com. Neurol. and Psychol.*, 1906, XVI., 200-216.

This article gives a study of two peculiar instinctive reactions in *Ranatra*. If a normal *Ranatra* is picked out of the water, it usually becomes motionless, either immediately, or after making a few slight spasmodic movements. This death feint may continue anywhere from a few moments to several hours. The state of death feigning may be made to continue almost indefinitely by stroking the body of the animal after it begins to come out of its feint. While in this condition, the body of the animal is in a state of tetanus and all sorts of unnatural positions, which the insect may happen to assume in the beginning of the feint, are retained for a long period of time. During this period of feigning, the animal shows no apparent signs of sensitivity. Holmes gives a table of the duration of successive death feints in several animals. The table shows quite clearly that the duration of the death feint diminishes with each successive trial.

It is also decreased when the insect is exposed to high temperatures, or to bright lights, and increased when subjected to low temperatures.

The removal of the supracæsophageal ganglia (by decapitation) causes a marked diminution of the time of the death feint. Holmes suggests that this is due to the heightened irritability, which follows when the inhibitory influence of this center is no longer exerted. When the body of the insect is cut in two across the middle of the prothorax, or across the hinder part of the thorax, the two parts of the body behave differently: The posterior portion comes out of the death feint more quickly than the anterior.

The writer also describes a second instinctive reaction which he calls 'deceptive quiet.' When a dish of water containing active *Ranatra*s is approached, the animals cease their movements and lie for a time with outstretched legs. This state of deceptive quiet seems not to be related to the death feint discussed above. In the death feint there is muscular rigidity, while in the latter there is muscular relaxation.

This latter reaction is said by Holmes to be the characteristic attitude of Ranatra in the presence of its enemy. He says nothing of the teleological value of the death feint.

J. B. W.

The Reactions of Crayfish to Chemical Stimuli. JAMES CARLETON BELL. Jr. Comp. Neurol. and Psychol., 1906, XVI., 299-327.

By a very careful series of experiments, Bell found that the crayfish reacts to chemical stimulation on any part of its body, and hence we must assume that there are chemical sense organs all over the body, just as we know is the case in some fishes. The anterior appendages show the greatest sensitiveness for all stimuli, either because they are better supplied with sense-organs, or else more used in food-getting.

Many experiments were made to determine the various reactions of the animals to different stimuli. Meat juices are reacted to quickly with a positive chemotaxis. To lavender-water, acids and salts, the reactions were rather indicative of a negative chemotaxis. The reactions to sugar and quinine were less definite. Quinine in general seems to exert a quieting effect.

When acid, salt, sugar and quinine were applied to the eyes, all caused retraction, acid and salt producing the most vigorous reactions. Hydrochloric acid caused reactions which gave 'every indication of pain.' Chemical stimulations with meat caused general restlessness and vague movements toward the source of the stimulation, but the animals seemed to depend upon contact sensations for the accurate localization of food.

The paper forms a good basis for further anatomical work on this form.

J. B. W.

Light Reactions in Lower Organisms. II., Volvox Globator.

S. O. MAST. Jr. Comp. Neurol. and Psychol., 1907, XVII., 99-181.

This is one of the most completely worked out and best controlled pieces of research which has yet appeared, on the reactions of lower organisms to light. The writer's technique is good and his results are so accumulated that even the lay reader feels some confidence in the investigator's statements. The research, as regards its completeness, stands in marked contrast to a large number of studies on the reactions of lower organisms — studies which, for the most part, are dashed off for publication the moment a single point is gained.

Lack of space prevents a complete review of this paper. In it is

to be found a very thorough treatment of the anatomy of the eye-spots in *Volvox*, and the method of locomotion of this colonial form. The main part of the paper is taken up with orientation. It is found that the direction of motion in *Volvox* exposed to light is regulated by the relative intensity of the light on opposite sides of the colony, regardless of the direction of the rays. This, of course, will not harmonize with Loeb's oft-reiterated statements to the effect that the main feature in all phenomena of heliotropism is the fact that symmetrical points of the photosensitive surface of the animal must be struck by the rays of light at the same angle, etc., everywhere emphasizing the importance of the direction of the light.

Orientation in *Volvox* is not the result of trial and error reactions as is claimed by Jennings for *Stentor*, *Euglena* and other forms. *Volvox* colonies make no errors in the process of orientation. Likewise there is no evidence of a 'motor reaction' of the colony taken as a whole. Orientation is brought about, however, by motor reactions of the individuals which compose the colony.

J. B. W.

THE BEHAVIOR OF THE HIGHER INVERTEBRATES.

Du Rôle du Sens Musculaire dans l'Orientation de Quelques Espèces de Fourmis. M. PIERON. Bull. Inst. Gen. Psych., Paris, 1905, IV., 168-187.

Pieron experimented with the ants *Aphænogaster barbara nigra*, *Formica cinerea* and *Lasius fuliginosus*, for the purpose of determining how they find their way home. He made the following experiments:

1. The finger was passed across the trail: The ants on each side of the line of disturbance halted and spread out along that line. After a while, some accidentally struck the trail on the opposite side of the line and resumed their march.
2. The path was moistened with an aqueous decoction of ants taken from an alien nest: The ants retreated precipitately.
3. The path was moistened with pure water: The movements of the ants were not affected.
4. The path was brushed crosswise with odoriferous herbs: The ants hesitated momentarily, then passed on.
5. The dust of the path was displaced by a twig: The ants were not disturbed.
6. A shallow groove was made across the path: The ants hesitated, felt about with their antennæ, turned back and after a time passed on in the original direction.

7. Obstacles were placed in the path of the ants: They behaved as in the sixth experiment.

8. A familiar object was removed from the path: The ants behaved as in the sixth experiment.

9. An object was placed in their path, and after the ants had become accustomed to it, it was placed in another portion of the path: The ants were not disturbed by changing the position of the object.

10. Their eyes and antennæ were painted with opaque pigments: The ants continued along the trail in the usual manner. The ants in this condition, however, were likely to attack the workers of the same colony.

11. A sheet of paper sprinkled with fine soil, bits of turf and other detritus was placed across the path of home-bound ants: Whenever one of the ants mounted this trap, the whole structure was transported to a new situation in a place topographically similar to the path along which the ants had been moving. In each case, the ant continued in the direction it was going, about as far as the distance between the trap, in its original position, and the nest.

The responses recorded above are those made by *Aphaenogaster*. The responses of *Formica* and of *Lasius* varied somewhat from the above. Pieron, however, thinks they did not vary enough to invalidate the following conclusions.

1. Odors play a part in the life of the ant, but it is not by olfactory sensations alone that ants are guided on their journeys. In orientation on an individual or common road, the muscular sense plays a considerable, essential and probably unique rôle.

2. These experiments furnish evidence of a third mode of orientation, which consists, firstly, of a muscular memory of the various movements necessary to go from one point to another, and secondly, of a reversible memory, permitting a return to the original place independently of the faculty of orientation by vision or by the 'sens labyrinthique de l'espace,' or by following a trail by means of responses to olfactory stimuli. It seems justifiable to agree with Pieron that the kinæsthetic sense plays some rôle in the activities of ants; but these experiments certainly do not prove the existence in ants of a reversible muscular memory functioning in the manner contended for by Pieron. My own work gives experimental data which militate against this idea of Pieron.¹

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¹ See below the editor's review of Mr. Turner's preliminary paper.

The Habits of the Tent-Building Ant (Cremastogaster lineolata Say). WILLIAM MORTON WHEELER. Bull. Amer. Mus. of Nat. Hist., 1906, XXII., 1-18.

In this paper, Dr. Wheeler makes a critical study of *C. lineolata's* habit of sporadically constructing tents over colonies of aphids and coccids. These tents, which are occasionally constructed by other ants, are composed of agglutinated earth or vegetable detritus. In the words of Dr. Wheeler, "These structures are of local and sporadic occurrence, as if owing their origin to some unusual condition in the environment rather than to the normal instincts of the species." The material for study consisted of several carton tents obtained in the sandy barrens about Lakehurst, New Jersey. The paper contains an excellent historical resumé and numerous excellent illustrations. Indeed the paper contains the first adequate figures of these structures.

As to the possible function of the tents, Dr. Wheeler mentions four suppositions: (1) they prevent the escape of the aphids and coccids to other plants or other parts of the same plant; (2) they protect these insects from their natural enemies or other ants; (3) they protect the aphids and coccids from cold; (4) they protect the ants from exposure. To the best of my knowledge, Dr. Wheeler is the first scientist to lay stress on the fact that the protection from cold afforded the aphids and coccids by these tents would be of value to the ants; however, he thinks that the main use of these tents is to exclude more powerful competitors for the excreta of the insects. To use his words: "It is not improbable, therefore, that *C. lineolata* in constructing tents over its charges merely emphasizes its sense of proprietorship in the presence of the larger and more powerful ants with which it has to compete in the struggle for existence; and it may well be that the tents are constructed only in the localities where such competition is unusually severe."

Although the utilitarian value of the tents is manifest and to some they may seem admirable examples of foresight and reason, yet the author is convinced that their construction is due not to intelligence but "to hereditary, instinctive disposition in all colonies of the species, but manifesting itself only under conditions formerly prevalent or universal, but now of rare and sporadic occurrence." The inference that this sporadic tent-building is a reversion to an ancestral habit is supported by the following facts: (1) in the tropics, many genera live in suspended carton nests; (2) in the tropics, a few species of *Cremastogaster* live in carton nests; (3) in this latitude, *C.*

lineolata, in constructing its nests under stones, sometimes uses agglutinated detritus; (4) in at least one instance, *C. lineolata* has been known to construct a carton nest in which the whole colony resided.

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THE UNIVERSITY OF CHICAGO.

On the Founding of Colonies by Queen Ants, with Special Reference to the Parasitic and Slave-Making Species. WILLIAM MORTON WHEELER. Bull. Amer. Mus. Nat. Hist., 1906, XXII., 33-105.

This paper, an acquaintance with which is indispensable to students of the parasitic and slave-making species of ants, is the result of a large series of experiments made by compelling artificially 'deälated' female ants to consort with small colonies of alien workers. Animal psychologists will be interested to note that some of the conclusions are opposed to certain of Miss Fielde's contentions and to learn that Dr. Wheeler has placed much emphasis upon the then little recognized fact that "the instincts of the ant species have their center of gravity, so to speak, in the female and not, as is usually supposed, in the worker."

In the paper, three methods of founding colonies are discussed; the typical, the redundant, the defective. Typically, the female, unaided, founds a colony and raises her first brood, feeding them by converting her fat-bodies and degenerating wing muscles into food. During this time, the female fasts. In the second case, the female not merely founds, unaided a colony and raises her first brood, but she carries over to that colony and cultivates certain plants which, for countless generations, have been raised by the stock for food. In the third case, the female cannot form a colony unless aided by the workers of some other species.

Under this third or defective method of forming a colony, Dr. Wheeler recognizes three conditions: temporary social parasitism, permanent social parasitism, and dulosis or slavery. Temporary social parasitism is where the female seeks and obtains adoption into a queenless colony and gets those workers to raise her young. When these young have matured, they emancipate themselves from their hosts. This emancipation is secured either through the death of the host species or the emigration of the guest species. Permanent social parasitism begins in the same manner as temporary social parasitism, but the guest species and the host species continue to dwell together as one colony. Dulosis begins in a different manner. A solitary

female enters a small colony of an alien species, and, after killing the workers, adopts and raises their progeny as the first step towards the bringing up of her own offspring. Later the offspring of this female make raids upon other colonies, using a portion of the booty for food and raising the rest as slaves.

Dr. Wheeler's observations seem to warrant the following conclusions: (1) the workers of one species are hostile to females of other species; (2) this hostility is not always manifested with the same intensity; (3) females are sometimes adopted by adult workers of the same species but of different nests; (4) animosities among ants are not in all cases reactions to unfamiliar odors; (5) slavery has no direct ontogenetic nor phylogenetic connection with temporary social parasitism; (6) probably young and vigorous females of nearly all species, when confronted with a few hostile ants and their brood, will kill the ants and take possession of the brood.

C. H. TURNER.

THE UNIVERSITY OF CHICAGO.

The Queen Ant as a Psychological Study. WILLIAM MORTON WHEELER. Popular Science Monthly, 1906, LXVIII., 291-299.

This is simply a recasting in a popular form of certain facts supporting Dr. Wheeler's contention that the female is psychologically the highest developed member of an ant colony.

C. H. TURNER.

THE UNIVERSITY OF CHICAGO.

A Preliminary Note on Ant Behavior. C. H. TURNER. Biolog. Bull., Vol. XII., 1906, 31-36.

There are several significant points in this paper. First, Turner shows that ants do not slavishly follow back the homeward odor trail as is maintained by Bethe and others.

This fact is proven by the author's rather ingenious method of having the ants learn to mount a card-board stage for pupæ. After many random movements, the ants learned the way from the stage to the nest and back. When the association was established, a second inclined plane was so placed as to lead from the opposite side of the stage to the nest; since no ants descended by this new route, the evidence is clear that all the ants had learned to go home by the other path. The first incline, which had become thoroughly scented by the passage of the ants, was now exchanged for a fresh, unscented one. The scented incline, however, was not discarded but was placed on the

opposite side of the nest, replacing the unscented one there. "Thus there was an unscented path in the position of the old trail and the old familiar scented path was in a new position."

The ants now, if they are 'reflex machines' "should either have spent approximately as much time learning the way down the new incline as they did before, or else, in their random movements they should have happened upon the scented incline and gone down it."

But the ants went almost immediately down the unscented path! These group experiments were controlled and the results thereobtained were affirmed by using marked individual ants. By further experiments, Turner shows that the direction of the light plays an important rôle in determining the course of the ants.

Other interesting statements are made in the Note, but the details of the experiments leading to them are omitted until his complete paper appears.

J. B. W.

The Habits, Instincts and Mental Powers of Spiders, Genera Argiope and Epeira. JAMES P. PORTER. *Am. Jr. of Psychol.*, 1906, XVII., 306-357.

On the historical side of this paper, Dr. Porter has gleaned from various sources and put into summarized form the main psychological facts of interest concerning the behavior of spiders. This part of the work is so well and compactly done that one is almost immediately given the proper setting to the writer's own observations.

To better observe the reactions of the spiders, they were brought into the laboratory and supplied with as natural an environment as was possible. Such subjects as the choice of a place for a web, the nest and material for the nest, the manner of building the web and its variability are discussed. A quantitative measure of the variability of instinct was determined by counting the elements in parts of the webs.

Further instinctive activities were studied, such as the time of spinning the web, and the stimulus which releases the movements concerned in this act, feeding habits, web-shaking, mating, etc.

Some controlled experimental work was done towards testing the factor of adaptability in the reactions of these spiders, but the present work is merely 'eine bahnbrechende Untersuchung'—Dr. Porter promising a later experimental paper.

This type of study will have to be undertaken more and more often now, as comparative psychologists begin the study of new forms. The older studies by the general 'naturalist' are practically worthless as a point of departure for scientific work on behavior.

J. B. W.

Les Abeilles n'Exécutent—Elles-que des Mouvements Réflexes ?

GASTON BONNIER. *L'Année Psychologique*, 1905, 25-34.

This is a controversy between Bonnier and Netter as regards whether certain reactions in domestic bees are reflex or 'intelligent.' The reactions in question are as follows:

1. 'Le soleil d'artifice' or 'Parade' of the bees. This reaction can best be observed on bright sunny days before hives containing many young bees. "One perceives the numerous workers before the gum, flying in larger or smaller circles with head turned towards the entrance of the gum; the exercise once terminated, the bees all enter the hive." Netter holds that this is a mere 'reflex,' while Bonnier claims that the 'parade' is gone through with only by young bees who are habituating themselves to the entrance to the hive.¹

2. The act of fanning or ventilating—referring to their habit of disposing themselves along the landing to the hive with head directed towards the entrance and body held stiffly erect, all the while rapidly moving their wings. Netter says this is due to need of respiration; Bonnier holds that the reaction is necessary to evaporate the water from the day's collection of honey. The number of animals reacting in this way is proportional to the amount of honey collected—"les ventileuses exécutent un travail réglé par la colonie et qui a pour effet de faciliter la sortie de vapeur d'eau, l'évaporation du miel jeune et so concentration, en établissant methodiquement dans la ruche un courant d'air, d'autant plus fort qu'il ya plus de récolte et par consequent plus d'eau à évapérer."

3. The act of cleansing the hive—the carrying away of dead bees, larvæ, etc. Netter explains this on the basis of the high irritability of the bee, saying that the workers on leaving the hive in the morning stumble over the debris and becoming 'furieuses' take the objects outside. Bonnier contends that this reaction is a striking example of the execution of work 'commandé et parfaitement réglé par la communauté.'

The fourth refers to the act of guarding. Certain bees on the outside of the entrance to the hive have apparently the function of guarding the hive from parasites, enemies, etc. Netter holds that this is a reflex function, the stimulus to attacking the intruder being its strange and too lively movements. Bonnier claims that the act is intelligent.

The whole contention is tedious. Better controlled observation and less discussion would benefit most of the research productions of the German, Swiss and French investigators referring to the behavior of ants and bees.

J. B. W.

¹In quoting from Netter, Bonnier does not state what constitutes the stimulus to the reflex and the original articles are not accessible to me at Tortugas.

THE BEHAVIOR OF BIRDS AND MAMMALS.

Further Study of the English Sparrow and Other Birds. JAMES P. PORTER. *Am. Jr. Psychol.*, 1906, XVII., 248-271.

As its title indicates, the above paper reports the results of some further studies on the English sparrow. In addition to the half-dozen English sparrows under observation, a cowbird (♀), a dove-cote pigeon (♂), and a passenger pigeon (♀) were experimented upon at the same time.

The birds were tested with a simple maze and with a food-box. The maze was offered to the Vesper sparrow, the cowbird and the four English sparrows. The vesper sparrow made the poorest showing, whereas the cowbird and the English sparrow made records about equal. On the memory test for this maze, which was made after an interval of thirty days, all the birds made a good showing; the cowbird showed the best results, however, having 'forgotten' almost nothing of her experience in learning the maze a month previous. When the birds were tried in the reversed maze, it was found that the time of the first records of the birds was very high. The old habit of going in a certain direction persisted and only gradually gave way before the new conditions. These experiments on the maze go to show that "the birds do not depend upon sight alone for their cues as to where to turn and in which direction, but on a sense of direction and distance as well. That this is, at least in part, in terms of muscular sensations, is probable."

The food-box (latch inside, opened by pushing or pulling any one of four strings on the outside of the box) was tried upon the cowbird and the two pigeons. All of the birds learned to get the food, adopting, especially at first, different instinctive reactions for getting open the door. The birds are too few for any kind of inter-comparison as regards differences in intelligence to be made.

Some tests were made for the purpose of getting at the ability of these birds to discriminate 'designs' — glasses containing food but differently marked. Some experiments were likewise made to determine their ability to discriminate color. These latter tests are so unsatisfactory that the reviewer will neglect them.

The article as a whole is rather unsatisfactory because of (1) the small number of animals employed; (2) the wild state of most of the birds, especially of the English sparrows; (3) of the very limited number of tests made.

We venture to call in question the wisdom of averaging the first and second trials, the third and fourth, etc., instead of presenting the

separate time of the first, second, third, etc., trials. Such a method of presentation makes comparison with the work of others impossible. Likewise, the paper presents all *times* in seconds instead of in minutes and in decimals thereof. It is exceedingly difficult to get any immediate meaning out of 670 seconds, 810 seconds, etc. The decimal and metric systems were long ago adopted for all scientific purposes, and in the reviewer's opinion, it is wise to adhere to them in researches on animal behavior.

J. B. W.

The Mental Life of the Domestic Pigeon. JOHN E. ROUSE.

Harvard Psychological Studies. Vol. II., 1906, 581-613.

This paper reports an 'investigation of certain emotional and associative processes of the domestic pigeon.' The writer's work on the emotional processes appeared in the *Jour. Comp. Neurol. and Psychol.*, 1906, III., 161-162. This notice will, on that account, deal only with the associative processes of the pigeon discussed in the paper.

After a brief review of the literature of the subject, the writer, in characteristically ambiguous and involved phraseology states his purpose 'to determine the sense-data which the process involves, its method of formation (with due regard to social conditions), its rapidity, permanence, and modifiability, and also its probable degree of complexity. Material contributing to the subject was secured by observing the behavior of the animal when seeking to obtain food by overcoming such obstacles as labyrinths with wire passages, and latches, when the food was left in view or by finding it when out of sight." Tests upon the formation of sound associations were made, and also upon the possibility of learning by imitation. Considerable attention was paid to tests as to the influence of position, color and form, and the possibility of the formation of associations by employing such means.

In general, the investigator states that pigeons form associations only by the trial and error method, the learning curve being similar in contour to those reported of other animals. "Visual, acoustical, probably tactual, and certainly organic data, are the principal sensory factors of such associations." These are fairly permanent but easily modified.

"While these birds seem mentally inferior to English sparrows and to various mammals which have been tested in a similar manner, they are capable of numerous ready adjustments. They discover circuitous labyrinth passages, they learn to manipulate latch apparatus when adapted to their natural habits and conveniently placed, and they

easily reach their food by depending upon the position, color, or form of the box containing it." There is nowhere evidence of learning by imitation.

The paper is valuable as pioneer experimental work upon pigeons, but the reviewer feels that many of the tests were not well enough controlled to justify the conclusions drawn from their results.

FLORENCE RICHARDSON.

THE UNIVERSITY OF CHICAGO.

The Imitative Tendency of White Rats. CHARLES SCOTT BERRY.
Jour. Comp. Neur. and Psychol., XVI., 1906, 333-361.

The purpose of this study is to determine to what extent rats learn by imitating one another.

Ten rats, four of which were black and white, the remainder albino, were used in the series of experiments with problem boxes requiring more or less manipulation. In each case, the solution of the problem consisted in obtaining freedom from the box in order to reach food outside. Seven such boxes were employed, though the conclusions seem to have been mainly drawn from a consideration of results with one box, which involved the pulling of a bent wire with the teeth and forepaws.

An untrained rat was put into the box and if he failed to get out within a certain length of time, a rat trained to the solution of the problem was also put in. The trained rat left the box at once, and the untrained rat, by 'seeing' the act performed 'learned' to accomplish the result. The writer states that the untutored rat 'watched' the other, and that 'when one followed another, it was with a knowledge of the end to be gained by that following.'

While the untrained rats undoubtedly learned to leave the box, the experimenter has not shown that the learning process was one of voluntary imitation. Furthermore, he has not shown the rat to be capable of such acuity of vision as he assumes. In view of the experiments of Small and of Watson which render it highly problematical whether the white rat uses vision for accurate orientation, definite proof of this point is indispensable. The contention for the presence of the function of voluntary imitation in these animals needs to be supported by a much more varied series of facts than is offered by Berry before it can be accepted by the majority of psychologists.

Owing to a lack of careful summarization and to too much condensation of the experimental material, such facts as are offered are inadequately put forth.

FLORENCE RICHARDSON.

THE UNIVERSITY OF CHICAGO.

Kinæsthetic and Organic Sensations: Their Rôle in the Reactions of the White Rat to the Maze. JOHN B. WATSON. Monograph Supplement to Psychological Review. Vol. VIII, No. 2.

The author, working with both normal and defective animals, confirms the conclusions of Small to the effect that the white rat learns and later traverses a labyrinth path largely by means of kinæsthetic and organic sensations. Visual data, if they exist at all in the animal, are certainly not used by it in associations like those formed in the maze.

These experiments should make it imperative upon every one experimenting with animals for the purpose of demonstrating the presence of imitation and other higher mental processes to show beyond a doubt that the animal in question can react definitely to a variety of simple and complex visual stimuli.

J. B. W.

THE UNIVERSITY OF CHICAGO.

BOOKS RECEIVED FROM AUGUST 5, 1907 TO SEPTEMBER 5, 1907.

Proceedings of the Aristotelian Society, New Series, Vol. VII.

Containing the Papers read before the Society during the Twenty-eighth Session, 1906-1907. London, Williams and Norgate, 1907. Pp. 244. 10 sh. 6 d. net.

Twenty-third Annual Report of the United States Civil Service Commission for the Year Ending June 30, 1906. Washington, Government Printing Office, 1907. Pp. vi + 202.

Behind the Scenes with the Mediums. DAVID P. ABBOTT. Chicago, Open Court Publishing Co., 1907. Pp. vi + 328. \$1.50, net.

Hygiene of Nerves and Mind in Health and Disease. AUGUST FOREL, M.D. Trans. from Second German edition by HERBERT AUSTIN AIKENS, Ph.D. New York, G. P. Putnam's Sons, 1907. Pp. vi + 344. \$2 net.

Sociological Papers. Vol. III. Published for the Sociological Society (London), New York and London, Macmillan, 1907. Pp. xi + 382. 10 sh. 6 d.

Ricerche di Psicologia. Volume Secondo. R. Istituto di Studi Superiori di Firenze. Florence, Tipografia Cooperativa, 1907. Pp. xxv + 148.

THE PSYCHOLOGICAL BULLETIN

THE LEARNING PROCESS.¹

BY PROFESSOR EDGAR JAMES SWIFT,

Washington University, St. Louis,

AND

MR. WILLIAM SCHUYLER,

McKinley High School, St. Louis.

The special feature of this investigation of the learning process consists in an accompanying curve of errors, traced from the number of mistakes made by the subject during each day's practice. The method followed in the practice tests differed from that of the writer's earlier investigation of typewriting, when lettered keys and the sight method were used. In the present instance the touch method was followed, the writer keeping his eyes on the copy. The exercises contained in Grant's typewriting manual were used until they were exhausted, and after this, lectures and essays were copied. The manner of measuring the rate of progress was also changed. In the former investigation the word was the unit of measure, and the number of words written during the period of the test gave the day's record, but this time it was the number of strokes made which determined the daily score. This, of course, included punctuation and spacing, as well as each letter written, and was, therefore, a more accurate unit of progress than the word.

The machine used in the test was the latest Underwood, with the universal key-board. Two years before, Mr. Schuyler had used an old fashioned caligraph, but the key-board of this was so different from the modern machine that the skill acquired at that time was of no assistance in mastering the Underwood. Except for this practice

¹ The tests which form the basis of this paper were made, at the suggestion of the writer, by Mr. William Schuyler. The pressure of other interests, however, caused him to turn over his material to the undersigned with the request that he prepare it for publication. — E. J. S.

on the caligraph, which ended two years previously, Mr. Schuyler had never used any typewriter.

The investigation was continued through sixty-six consecutive days, with the omission of Sundays, the first half hour in the morning, from eight to half past, being set aside for the work. The practice tests of the experiment closed December twenty-sixth, and on the twentieth of the following March a memory test was begun, the curve

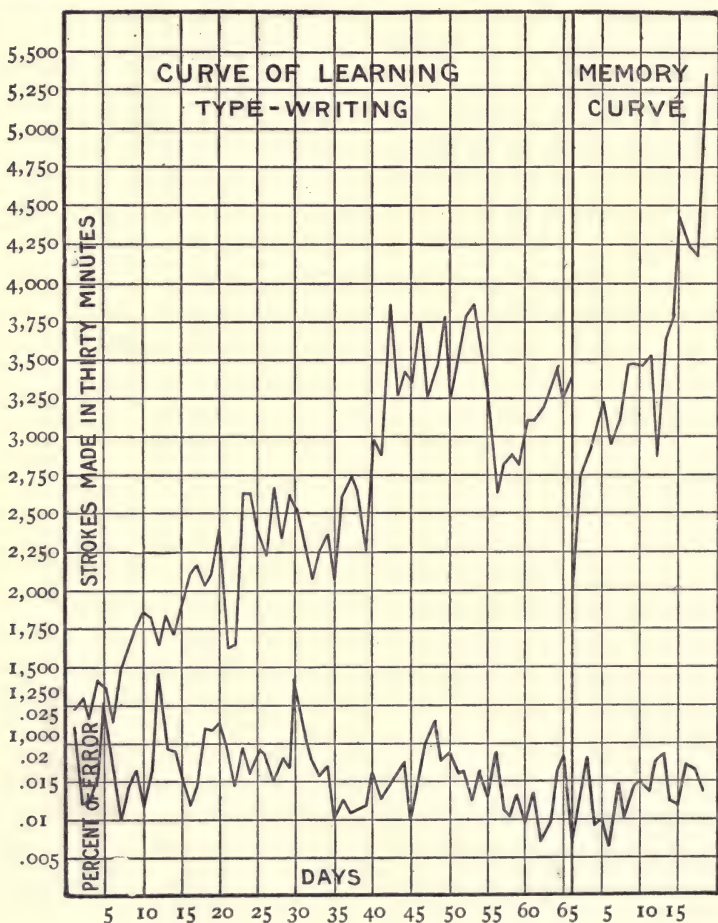


FIG. I.

of which will be found at the right of the vertical line drawn immediately after the sixty-sixth day, the close of the regular practice tests. During the interval Mr. Schuyler had not used the typewriter, except to copy one letter.

The curves are given in the figure, the upper one representing the

daily progress in the work, and the lower giving the percentage of daily errors. The figures to the left of the curve of learning show the daily progress, while those to the left of the curve of errors give the daily percentage of errors. The days during which the tests were made are shown by the figures below the horizontal line. The curve of the memory test, which was begun eighty-four days after the conclusion of the practice tests, and continued eighteen days, stands at the right of the practice curve, with the corresponding curve of error below, as before. The reason for continuing the memory test through eighteen days was to determine the new rate of progress.

The upper curve is seen to take the irregular form which the writer's earlier investigations have shown to be characteristic of the learning process.

Up to the twelfth day Mr. Schuyler used only two rows of keys, but at this time the third row was introduced into the work, though at first only for practice on the location of letters. The use of the third row for sentences was begun on the fourteenth day. On each of these days, as the curve shows, the score dropped noticeably, but it will also be seen that recovery of former speed was rapid.

The marked drop of the twenty-first day was due to the delay caused by learning to use the shift key for capitals and punctuation. It is interesting to observe here that the percentage of errors was much reduced on this day, and that those which were made did not occur in the capitals.

No reason can be assigned for the low record of the thirty-first and thirty-second days. Mr. Schuyler's notes say that he slept well the previous night and that he felt in unusually good condition. The recurrence of the low score on the thirty-fifth day, however, may be accounted for by the fact that at this time the writing of connected matter took the place of simpler, disconnected sentences. The low percentage of errors on this day is worthy of special observation, since, with the exception of the seventh day when the subject was using two rows of keys, they are fewer than at any previous time.

On the thirty-seventh day Mr. Schuyler finished the exercises in the manual, and the next day he began to copy one of his own lectures, written some months before. This sort of work was continued through the forty-second day when the exercise was changed to repeating the same sentence throughout the entire half hour. This repetition-exercise, which was continued through the fifty-fifth day, puts this period of time into a group by itself. The most interesting fact regarding it is, perhaps, the plateau. It is rather remarkable that these two weeks, each day of which was spent in practice on a single, short sentence,

brought no increase of speed. On the fifty-sixth day, at the writer's suggestion, Mr. Schuyler again took up the copying of connected thought which he continued until the close of the investigation. As the curve shows, five days were required to regain the speed which he had acquired at the time of beginning the repetition-exercise.

Mr. Schuyler agrees with the writer that there is no separation of the higher from the lower habits. Early in his work some of the short, common words became automatic, but to the end, other longer and less frequent ones were written by letter.

The memory test was started eighty-four days after the close of the regular practice work. As is seen from the curve, eight days were needed to enable Mr. Schuyler to equal the speed with which the practice tests closed. After this his progress was strikingly rapid, the curve shooting upward with much the same form as the writer found in his earlier investigation¹ of memory.

In the curve of errors that which attracts attention is the remarkable persistence and regularity of the mistakes. The tracing shows that the mass of errors lie between one and two per cent., with an average error of a little over one and one half per cent. These errors, again, gradually diminish, during the entire period, at the approximate rate of eight thousandths of one per cent. per day.

In the memory tests the average per cent. of errors was found to be one and thirty-four hundredths, slightly less than that of the regular practice tests.

Examination of the written exercises showed that the errors always came in bunches, and, when in threes, one group was near the beginning, another about the middle, and the third toward the end. Sometimes there were only two groups, but after the mistakes were marked with red ink, the alternation of spotted spaces with those free from marks was striking.

With Mr. Schuyler, at least, there was no connection between the number of errors and the repetition of copy. He made rather more than the average from the forty-second to the fifty-fifth day, when he was repeating one sentence each day. It is also interesting to observe that increased speed was usually associated with a greater number of errors, though the proportional increase was not the same. On the twenty-third day, for example, when the count showed sixty per cent. more strokes than on the previous day, the increase in errors was forty per cent.

The relation of errors to progress in a new line of work calls for further investigation. Such a study might show what methods economize time and energy, by disclosing the conditions favorable to errors.

¹ *PSYCHOLOGICAL BULLETIN*, 1906, III., 186.

PSYCHOLOGICAL LITERATURE.

HARVARD STUDIES.

Harvard Psychological Studies. Volume II. Edited by HUGO MÜNSTERBERG. Boston and New York, Houghton Mifflin & Co., 1906. Pp. 644.

This volume contains twenty-three experimental articles by various authors, and five essays and speeches under the general heading 'Emerson Hall' by Professor Münsterberg. The experimental articles are grouped in the volume under the headings given in order below.

OPTICAL STUDIES.

Stereoscopic Vision and the Difference of Retinal Images: G. V. HAMILTON.

Eye Movement During Dizziness: E. B. HOLT.

Vision During Dizziness: E. B. HOLT.

Visual Irradiation: FOSTER PARTRIDGE BOSWELL.

Hamilton's experiment was on the binocular judgment of the difference in distance of two lines, one of which was at a standard distance of two meters from the point midway between the subject's corneæ. The lines were sections of the edges of two opaque screens, seen through a rectangular opening in a fixed screen a little distance in advance of the two. Observations were made: (1) With the eyes in normal position, *i. e.*, with the line of binocular regard perpendicular to the line joining the two corneæ, (2) with the corneal line turned 15° from this position, and (3) with a similar rotation of 30° . In each of these positions Hamilton obtained thresholds for movement of each edge toward and away from the eyes, and from the thresholds he concludes that binocular disparity alone is insufficient ground for stereoscopic effect, but that sensations of eye positions are required also.

This conclusion rests on two contentions: (1) That so far as the disparity of the images is concerned, turning the head to the left and consequently bringing the right eye nearer the edges relatively to the left eye, is equivalent to moving the right edge farther away with eyes in normal position; and (2) that nevertheless, the thresholds and apparent equality points are practically the same in the different positions although even the 15° shift of the head introduces binocular dis-

parity of images much greater than that due to moving one of the lines past the threshold with eyes in normal position. The disparity due to turning the head produces therefore no stereoscopic effect.

There are three defects in Hamilton's methods which make his results inconclusive. (1) With his apparatus the turning of the head was not really equivalent to moving one of the lines. This was because of the fixed rectangular opening mentioned above. Under that condition, moving a line backwards or forwards did not change its angular length, while turning the head shortened the lines relatively for the far eye in the same proportion as it decreased their angular separation. This feature of the disparity induced by turning the head is therefore just as prominent as the other and could easily offset it. (2) No account is taken of accommodation, which is certainly a factor at the distance of two meters. (3) In working up his results, Hamilton considers a difference of position in which the right line is moved back (a plus movement in his code), to be opposite in effect to a difference in which the left line is moved forward (minus movement), and so he averages the two algebraically in getting his equality point. In reality the differences of position are in the same direction, and if averaged at all should be averaged arithmetically; the result being not an average equality point but an average deviation of the two equality points from zero. Thus, in the case of Subject Tait, with the head turned 15° the two edges seemed at equal distances when the right edge was 5.91 mm. farther away, or the left edge 1.49 mm. nearer (the other edge in each case fixed at 2 meters), and hence Hamilton makes the 'middle point' at $+2.21$, which is of course an absurdity.

Aside from the unfortunate fixed screen Hamilton's apparatus seems to have been excellent, and adapted to secure great accuracy.

Holt's first paper is a report on photographing of eye movements during dizziness occasioned by rotating the subject about the vertical axis, twenty-five rotations in fifty seconds. By a very clever device the eyes were fixed in a position in two or three seconds after stopping the rotation, and the photographic exposure, with film moving vertically, began then and continued nine seconds. Holt tried first photographing the whole eye, and then a flake of zinc white on the cornea, but got no good results. Finally he used the corneal reflection of an A.C. arc light, and obtained some splendid photographs, showing clearly the slow movements in the direction of the previous rotation and the rapid recovery movements in the opposite direction. The duration of the slow movements is about six times that of the fast ones, but increases from the first to the ninth second, while the duration of the fast movements remains practically constant.

Holt's second paper describes observations on vision during the slow and fast eye movements of dizziness. The first experiment, on Holt himself, was on the vertical movements of an incandescent lamp at a distance of four meters, after rotation as above described. The uniform result was the perception of oblique motion, always in the direction due to the combined vertical movement of the lamp and the horizontal *slow* eye movements. Although in this case the lessened retinal effect of the lamp during rapid movements *might* account for its invisibility during such movements, the central location of the inhibition is indicated by corresponding observations during the photographic experiments. In these the subjects noticed that during rotation the arc lamp swam always with the rest of the visual field in the direction opposite the slow eye movements, although the arc lamp is an adequate retinal stimulus even during the fastest eye movements.

The second experiment was on the movements of after-images under the rotation conditions. The subjects, of whom there were four, obtained a lasting after-image before rotation, and found that during rotation the after-image moved in the direction opposite that of rotation, and after rotation moved in the direction of the rotation, *i. e.*, in both cases in the direction of the slow eye movements. Rotation about transverse axis of head (bending head over on one side), gave corresponding results. The image may be easily seen to repeatedly disappear at one side of the visual field and reappear at the other.

The final observation, confirmed on several subjects, was that while the rapid eye movements can be voluntarily inhibited, the slower ones cannot.

The most remarkable of the results of these experiments is that in all of them the visual field moved in the direction of the rotation during rotation, and in the opposite direction after rotation. The ordinary experience (as described by Delage in the passage quoted by Holt), is that during rotation the apparent movement of the field is in the direction opposite to that of the rotation and after rotation ceases the field apparently moves in the direction in which the rotation was. Yet Holt found unmistakably in every experiment that when the rotation was 'clockwise' the after movement, was 'anti-clockwise' (p. 71), and that in general the apparent direction of movement of the visual field was 'opposite to that of the slow eye movements' (pp. 68, 69), and these slow movements, as is well known and as Holt's photographs show, are during rotation in the direction contrary to rotation, and in the rotation-direction after rotation. If in some subjects, as in Holt's, the apparent movements are in one direction,

although in the ordinary subject they are in the other direction under the same conditions, while the eye movements are presumably the same in all cases, a new line of interpretation is opened up.

Boswell's experiments were on the apparent changes of shape which certain spots of light undergo when moved rapidly across the retina with the eyes fixed. By means of a pendulum device spots of various forms and not exceeding $1^{\circ} 10'$ of visual angle were moved at various rates over an area including practically only the fovea. Under these conditions the upper and lower portions of the figure appear displaced backwards, so that, for instance, a vertical bar appears as a crescent. Boswell believes that this is due to irradiation, which strengthens the central region of the lighted area, causing it to come to consciousness before the peripheral regions, and hence spatially in advance of them. To establish this explanation, Boswell tried darkening the middle regions of certain spots, and was able by proper darkening to prevent the backward displacement of the upper and lower portions, or to produce a forward displacement, although the amount of darkening necessary is hardly perceptible with the figure at rest. Spots of light longer vertically than the ones mentioned above gave a straight middle region with curved ends, since the irradiation along the middle region was nearly uniform.

By an ingenious arrangement of cross wires, Boswell measured the apparent curvature of a vertical band at different speeds and with different intensities and colors of light. He found that with increasing intensities the displacement at first increased and then decreased. Green gave the greatest maximum of displacement, red and blue the least, yellow being about midway between.

In the speculative part of the paper Boswell expresses the belief that the irradiation takes place in retinal layers more inward than the rods and cones, approves W. McDougall's neurological theory as a provisional scheme, and conjectures a central origin for color blindness.

FEELING.

The Expression of Feelings: F. M. URBAN.

The Mutual Influence of Feelings: JOHN A. H. KEITH.

The Combination of Feelings: C. H. JOHNSTON.

The Esthetics of Repeated Space Forms: ELEANOR HARRIS ROWLAND.

The Feeling-Value of Unmusical Tone-intervals: L. E. EMERSON.

Urban states at the beginning of his paper that the material for it was obtained by an experimental investigation carried on in the Har-

ward laboratory, but he gives no information as to the nature of the experiment. The paper is in substance a discussion of the nature and possible causes of the dicrotic elevation of the arterial pulse, with an excellent account of the several theories and of the study of the pulse from Marey's experiments to the present day. Urban decides that the cause of the dicrotic elevation is that which Landois assigned to the pre-dicrotic and post-dicrotic elevations, namely, arterial elasticity.

Keith presents with the least possible comment the results of a long series of experiments with two subjects on the hedonic ranking of various colors, tone combinations, and surfaces actively or passively touched. Twenty-seven tone combinations and fourteen of each of the other groups were separately given their values in the conventional scale of seven degrees of pleasantness-unpleasantness, and then the members of each group were combined in turn with members of the other groups and assigned values under those conditions. The general averages indicate that combining colors and tones lowers the agreeableness of both, while combining colors and passive touch or tones and active touch raises the agreeableness of both in both cases. For the other combinations the results are not concordant. No details of the effects of individual members of one group on the various members of the others are given.

Johnston's article is in many respects the complement to Keith's. The experimental results presented are merely a mass of introspection from twelve subjects, either on viewing Perry Pictures, or experiencing combinations of odors, tones, noises, touches, and space forms, a member from each of two of these groups being used in each combination. The deliverances of the subjects in attempting to tell the way things felt to them are an interesting study in elevated metaphor. Apparently neither subjects nor author spared words. The main problem seems to have been to find if two feeling tones could be present at once and if the general conditions of complex feeling tones agree with the Münsterburg Action-Theory, on both of which questions the author concludes affirmatively.

The first part of Miss Rowland's paper reports the introspection of seven subjects on viewing regularly repeated groupings of lines. The lines were white strings hung across a black background, shifted through a great variety of groupings. Miss Rowland thinks the introspection shows that the properties of repeated space-forms are analogous to those of auditory rhythm as the latter are set forth by MacDougall. The second part of the paper is devoted to a study of approved architecture, attempting to show that it embodies the same

principles as are brought out in the first part. Whether in either part the author makes out her case is not to be answered offhand. The material is presented with little regard for clearness, conciseness or unity, so that the reader can hardly escape getting lost in the diffuse miscellany of details.

Mr. Emerson experimented with what he designates by the unfortunate term 'amusical' melodies; *i. e.*, series of three notes on two pitches including an interval varying from 460:456 to 460:516, and from 384:436 to 384:516, by steps of four. The subjects estimated the values of the 'melodies' in the seven-degree hedonic scale, and afterwards estimated independently the harmony of the two pitches. Later, some experiments were made with from three to six notes on three pitches differing by 4, 8 and 12 vibrations, absolute pitch not stated. The results show that the intervals used do give decided feeling tones in most cases; that the preferences for melody do not correspond to those for harmony; and that the preferred melodic intervals within the range indicated are (according to Emerson), from four to eight vibrations less than the 'half or full tone of the musical scale,' and likewise fail to correspond with the musical intervals from the second to the fourth.

Emerson *apparently* takes account of *major* tones and semitones only, in computing musical intervals, and hence does not notice that the preferences are approximately for the minor tone and semitone. The paper is gotten up carelessly, to say the least, and the reader is left in doubt about many points. In plates showing melody-curves one may identify them with some trouble after he has decided whether the intervals marked are diatonic, chromatic, or tempered; but the significance of two sets of harmony-curves in one plate is entirely obscure, as is the reference to 'Tables I. and II.,' no tables being discernible.

ASSOCIATION, APPERCEPTION, ATTENTION.

Certainty and Attention: FRANCES H. ROUSMANIERE.

Inhibition and Reinforcement: LOUIS A. TURLEY.

The Interference of Optical Stimuli: (MISS) H. KLEINKNECHT.

Subjective and Objective Simultaneity: THOMAS H. HAINES.

The Estimation of Number: C. T. BURNETT.

Time-Estimation in its Relation to Sex, Age, and Physiological Rhythms: R. M. YERKES and F. M. URBAN.

Association under the Influence of Different Ideas: BIRD T. BALDWIN.

Dissociation: C. H. TOLL.

From the introspective records of eight subjects on their judgments of visual and tactual recognition, Miss Rousmaniere concludes that certainty has different characteristics in different individuals, and varies in degree in each one; but that the judgments pertaining to one sense have no different kind of certainty from those pertaining to another sense. Individual differences may constitute different types of certainty; but this is a surmise rather than a conclusion. Miss Rousmaniere also made experiments with attention to one factor of a complex visual object, to note the certainty of judgment to non-attended factors. Figures or letters, and geometric forms of various colors were simultaneously exposed on a card for two seconds, and the subject immediately afterwards enumerated what he had seen, grading his judgment regarding each factor (characters and form, color, and number of objects) in four arbitrary degrees of certainty. Results showed that although attention to one factor increased the percentage of judgments of highest degree of certainty with respect to that factor, there were also judgments of this degree with respect to the unattended factors. In spite of a few flaws, Miss Rousmaniere's paper is a model of clearness and conciseness.

Turley and Miss Kleinknecht experimented along the lines of Ranschburg's work on the effect of duplicates on memory. They exposed series of six arabic letters in succession and required the subject to write the series immediately afterwards. In Miss Kleinknecht's experiment each series contained one pair of duplicates in various positions, and the inhibition of the second of the pair was found to be greatest when they were adjacent, and when they occurred in the last half of the series. The method by which Miss Kleinknecht's results were computed is obscure, and in general she presumes entirely too much on the ingenuity of the reader.

In Turley's there were no duplicates in the series, but with half of the series a duplicate of the fourth member preceded it by intervals ranging from 1.11 secs. to 4.3 secs., the other series being for comparison with these. His results show that for intervals up to 2 secs., the preceding letter inhibits the memory of its duplicate, and for longer intervals favors the memory; and that there is a somewhat rhythmical variation in the amount of inhibition or reinforcement with increasing time.

Haines' first set of experiments was on the complication problem. A series of letters or figures mounted at regular intervals on a rotating disc and appearing before an eye tube was combined with the click of a sound-hammer. Variations of rate and length of series brought out

no new results. As an incidental variation a flash of light was combined with a series of clicks.

Next, to show that the time-error is not due to difficulty in attending to two processes at the same time, Haines carried on lengthy tachistoscopic experiments on the formation of from two to six judgments of recognition or comparison based on a group of stimulations simultaneously presented. He used Münsterberg's pendulum tachistoscope, with attachments for operating touch and sound-hammers, and required the subjects in various cases to report (1) which of two lines was shown (long or short); (2) which of two positions it occupied (high or low); (3) whether there were one or two touches on the hand; (4) whether the touches were on the right or left side of the hand; (5) which of two clicks was heard (faint or loud), and (6) whether the click was on the right or left of the subject.

In a second form of the experiment the judgments were purely comparative and all visual, the subjects being required to report on two lighted rectangles exposed together, as to (1) which was the taller; (2) which was the brighter; and (3) which had the greater number of lines across it. In the experiments of both forms the falling off in accuracy of the judgments where two, three or six were required simultaneously was so slight that Haines does not think his experiments show any interference of the various processes with each other.

The time-error in the complication experiment is due, Haines concludes, to the nature of time perception, by reason of which two processes are perceived as in the same specious present if the first has not changed perceptibly before the second begins. How this would account for the second being perceived as first, as many times happens, Haines does not clearly explain.

Burnett reports the results of a long series of experiments on the judgment of relative number based on the exposure of two groups of objects successively or simultaneously but too briefly to allow counting. In most of the tests the objects used were spots on a card, and these were varied in their shape and color, and in their arrangement, number, and dispersion on the card. In some other experiments black rings were substituted for the solid spots, and in still others steel balls in box frames were used. In some cases the subjects were stimulated by sounds of gongs or bells, by touches on the forehead, or kinesthetically, while one of the two groups was exposed.

Although the exact significance of the percentages set down in the

tables is not clear, the results can be summed up by saying that there are large individual differences as regards the effects of the various conditions on the number-judgment. The values of the data obtained by Burnett's experiment are much depreciated by the fact that the subjects were called on for introspection regarding the way in which the conditions were affecting their judgments. We have therefore neither figures showing the normal effects of the conditions, nor illuminative introspection.

Yerkes and Urban made or caused to be made tests of time judgment on 274 young women and 251 young men, all college or normal school students. These subjects were required to estimate in seconds the length of an interval verbally marked off to them under the four conditions of (1) idleness, (2) listening to reading, (3) writing, and (4) estimating as accurately as possible by any method except use of a timepiece. Time intervals of 18, 36, 72, and 108 seconds were given under each of these four conditions.

The results show that the women in general overestimated considerably the number of seconds in the intervals, and that the men slightly underestimated; that the men's judgments were less variable than those of the women; and that both men and women judged the intervals as longest while carefully estimating time, the other conditions standing in order of decreasing length: idleness, listening and writing. No mention is made of the influence of pulse-rate, although the pulse was taken in each case. The inclusion of 'Age and Physiological Rhythms' in the title is merely a notice of a future article on that subject.

Baldwin's principal purpose was to discover the relative efficiency of two words spoken in immediate succession, in determining the course of the associative train of ideas. In some cases pictures or visually presented words were used, and in still other cases the effects of three or four words were investigated. In general the second word was found to be much more effective than the first, the third less effective than the second, and a fourth more effective than the third. Aside from the order, concrete terms were more effective than abstract; names of wholes more effective than names of included parts; proper nouns than common nouns; and what Baldwin calls 'specific' terms more effective than those he calls 'general.' In these two last categories however he includes simply names of objects presently more interesting to the subject and less interesting respectively.

Toll's experiment was an attempt to compare the efficiency of association by similarity with that of association by contiguity. A

series of letters, figures, or words, containing rather formal and arbitrary similarities was presented for a few seconds, and the subject reproduced it immediately afterwards. The similarities seemed more effective than the contiguities, although the significance of the tables of results is somewhat unclear.

MOTOR IMPULSES.

The Accuracy of Linear Movement: B. A. LENFEST.

The Motor Power of Complexity: C. L. VAUGHAN.

Lenfest investigated the accuracy of regularly repeated linear movements of right and left hand and foot and of the head, at rates from 20 to 200 strokes per minute, and with extents of movement from 1 to 14 cms., using a modified ergograph and computing results with the planimeter. He obtained a large mass of interesting data which it seems impossible to sum up, and established the general fact that the rate of movement at which accuracy is greatest varies with the member moved and the extent of the movement.

Vaughan measured with the chronoscope the time taken to count series of dots, of more complex figures, of identical letters, of letters composing a sentence, and of pied letters. He found that the simple figures are counted more quickly than the complex, the differences being clear and practically uniform for seven subjects. The results with the letter series are not decisive. Next, Vaughan registered kymographically the finger reactions of seven subjects to figures of various degrees of complexity, presenting the figures serially. The subjects tried to make all movements of exactly the same extent, but the results show that the reactions to the more complex figures were uniformly greater than the reactions to the simpler ones. To the account of these excellent experiments Vaughan adds some physiological speculation which is rather large and tenuous for its modest basis.

ANIMAL PSYCHOLOGY.

The closing division of the volume contains two papers by Dr. Yerkes on the reaction-times of frogs, a paper by J. Carleton Bell on the movements of crayfish under the influence of various stimulations and conditions, and a paper by John E. Rouse on the emotional reactions and associative processes of the pigeon. This division sets a high standard of presentation, to which it is much to be regretted that more of the articles in the earlier divisions do not approach. These four papers on animal psychology are doubtless of great value

to those carrying on similar lines of study, and Rouse's paper could be safely recommended as of interest to the general reader.

KNIGHT DUNLAP.

JOHNS HOPKINS UNIVERSITY.

VISION.

A Visual Illusion of Motion during Eye Closure. HARVEY CARR.
Monograph Supplement, Psychological Review, Vol. VII., No. 3.

Illusory movements occur with closure as with finger pressure. These movements have both a lateral and a third dimensional component. Their direction and extent vary with the position of the eye in the head. With some subjects there are positions of no movement (zero points). The purpose of the paper is to study their determining conditions in relation to the concomitant physiological changes. Zero points were possessed by three out of six subjects. There is but one point for each eye. The two points for each subject are the same distance below the point of fixation of the primary position, but the distance varies for subjects; this distance is an angular constant for all degrees of convergence. The points are equidistant from the median plane; this distance varies among individuals, and is a linear constant for all degrees of convergence. The point of fixation of the primary position is not always in the median plane. Where zero points are present, the image movement for any fixation position is directed away from the zero point toward the periphery of the field of regard; the length of any movement has a given relation to the distance of the fixation position from the zero point; this relation varies among individuals. With subjects having no zero points, the direction and extent of the movements vary with the fixation position, but are similar for the two eyes. In some cases the presence of the movements depends upon the degree of convergence. The occurrence, direction, and extent of the movements are functions of the position of the eye in the head, the degree of convergence, and the character of the closure. The movements refer to the entire visual field. With binocular closure each field moves relatively independently of the closure of the opposite eye. A nasalward finger pressure generally produces the same effects as does closure. The direction and extent of these movements are functions of the position of the eye in the socket and the direction and intensity of the pressure. Suction produces the same results as closure. These lateral displacements occur for subject I. during extreme peripheral rotations. The direction of the movement is toward the periphery of the field of regard, thus varying with the position of

the eye in the head. The movements are sometimes slightly curved, and the field may rotate about the line of sight. The movements with closure, pressure, and suction refer to the entire visual field, but their direction and extent vary for different parts of the field during the same displacement. The visual field is enlarged in that part of the field toward which the movement is directed. The apparent size of the images decreases, their form changes irregularly, and they become less bright and much confused in surface and contour. Third dimensional components are present for most subjects in some conditions. The presence, direction, and extent of this component vary for subjects in similar conditions, according to the degree of convergence, the position of the eye in the socket and the character of the winking; they are also conditioned by an interpretative factor.

The visual phenomena may be conditioned by (1) normal rotations of the eye, (2) refractive changes, or (3) rotary-displacement movements of the globe. The image movements due to closure have been noted, but no explanation has been attempted. The movements due to pressure have been explained by normal eye rotations, but the rotation was assumed, and not proven. Authorities are sceptical of any displacement or refractive changes of the eyes, but nothing definite is known as to the changes occurring during closure or pressure. Rotary-displacement movements of the eye, *i. e.*, a rotation about some center other than the normal center of rotation, are proven by several experiments: Ophthalmoscopic tests prove that the lateral image movements are conditioned by an appropriate shift of the retinal stimulation. The stimulation from an object affixed to the cornea is not shifted on the retina, and hence the image movements are not a result of refractive changes. The eyeball must move, and the character of the movement is determined from measurements of the corneal and retinal movements. Refractive changes are evidenced by the presence of a slight movement of the object affixed to the cornea, movements of the iris, distortions of the form of the pupil, and changes in the images reflected from the lens. Nothing definite as to their character could be determined.

The visual phenomena due to the eye movements are the lateral image movements due to closure, pressure, suction, and normal rotations, and the sagittal rotations. The eye is not a perfect sphere, and is subjected to different tensions during rotation and convergence. Suction, pressure, and closure are disturbing mechanical forces. Hence the extent and direction of the image movements are conditioned by the position of the eye in the head, the degree of convergence, and the

character of the disturbing force. The visual phenomena due to refractive disturbances are the changes in the size, form, and brightness of the visual images and the unequal movements in different parts of the visual field.

The point of fixation, negative after-images, entoptic phenomena, and the object affixed to the eyeball, *i. e.*, the images corresponding to a fixed place on the retina, do not move with pressure or closure, but do move with normal and superimposed rotations. The distance and directional location of a visual image corresponding to any point on the retina in relation to the position of the Cyclopean eye is called the 'space reference of the retina.' This space reference is made a function of ocular innervation. Illusions will occur whenever there is any discrepancy between the position of the eye and the space reference, or the state of innervation, *i. e.*, whenever the space reference changes when the eyes are still, or when the eyes move with no change of space reference. The illusions thus embraced are those due to (1) paralysis or paresis of the eye muscles, convergence, and prism distortions, (2) lid closure, finger pressure, suction, jars on the head, autokinetic sensations, extreme rotations. In the first class, innervation occurs with no proportional eye rotation, and in the second, the eye is moved by extraneous forces where innervation is not present. The directional relation of the space reference to the head is a function of a synergic innervation (that tending to produce a parallel movement of the eyes) and the distance relation is a function of a convergent innervation (that involved in distance adjustments, whether it be to the lens or eye muscles). The space reference is made a function of muscular innervation because (1) changes in space reference and changes in innervation are found together in all cases, (2) the space reference is not anatomically related to either eye, (3) it is not a function of the afferent conscious processes of either eye, (4) of afferent physiological processes, (5) of attention, or (6) of memory imagery; (7) there is no evidence in favor of the existence of 'innervation feelings,' nor (8) is there any *a priori* objection to making it a function of a purely physiological process.

No single principle of explanation can be found applicable to all cases of the third dimensional movements. The phenomenon is a result of a central factor and five peripheral factors working in conjunction. These peripheral criteria of depth are (1) decrease of brightness, (2) decrease of size, (3) confusion of surface and contour, (4) changes of convergent innervation and (5) the binocular parallax.

By controlling the space reference of the retinae, the ocular inner-

vation furnishes a given and fixed set of conditions governing the possible relations between visual and tactual-motor space experiences. It thus makes possible a mutual definition and coördination of the one to the other. These *conditions* are empirically worked out and interpreted as *relations* through the afferent conscious processes.

THE AUTHOR.

Über Einrichtungen zur subjectiven Demonstration der verschiedenen Fälle der durch das beidäugige Sehen vermittelten Raumanschauung. M. VON ROHR. Zeitschrift f. Psych. u. Phys. der Sinnesorgane, 1907, Bd. 41, Abt. II., 408-429.

The object of this article is to describe a series of optical instruments by which the geometrical relations of the rays of light entering the eye from external objects may be changed from the normal so that various modifications of space perception may be subjectively demonstrated. These changes occur in two main ways. In the first the direction of the rays of light is modified in a like manner for the two eyes, and in the second the relative direction for the two eyes is modified. In the first place, then, without changing the relation between the two 'object eyes,' that is the eyes conceived as being in the position to which the rays of light would pass if they had not been deflected by the optical instrument, there are three possible courses of the rays of light as they pass from the object to the eye. The first is the entocentric, in which, as in normal vision, rays from objects at a finite distance from the eye converge, so that nearer surfaces subtend larger visual angles than more distant surfaces of the same size. In the second, or telecentric arrangement the eye is placed at the focus of a lens which converges the parallel rays coming from an object, so that surfaces of the same size subtend the same visual angle at whatever distance they may be. In the third or hypercentric arrangement the opposite of the condition in the entocentric arrangement is obtained by using a lens which converges rays into the eye that have diverged toward it from a finite distance, so that surfaces which are nearer subtend a larger visual angle than those which are farther away. So far the visual axes of the two eyes have been considered as parallel and the 'object eyes' in the normal relative position, that is with the same distance between them as between the actual eyes, and with the nasal side of each toward that of the other.

Two main variations from this position may be made, the crossed or chiasmoptical position as produced by the pseudoscope, and the synoptic position in which the 'object eyes' are situated in the same place, or

one behind the other so that the visual axes correspond. An intermediate position may be produced in which the 'object eyes' are brought together but not so far as to be in the same position. With each of these positions as with the normal, or orthoptic, there are three possible courses of the light rays as they enter the eye from the object: the ento-, tele-, and hypercentric. There are therefore nine arrangements in all. Of these nine possible arrangements the first is the normal. Some of the others have been in use for various purposes. The combination of the pseudoscopic with the telecentric arrangement has been used for the binocular microscope. An instrument called an 'eikonoscope' which brings the 'object eyes' near together for the purpose of reducing the spatial characteristics due to binocular vision in viewing paintings for example, or other two-dimensional objects, was devised by Javal. The author carries this principle further to a synoptic arrangement in an instrument which he calls a pinakoscope.

The author discusses in some detail the optical instruments by which these and other arrangements may be made, some of which have been previously known and described and others of which were devised by himself. He touches only incidentally upon the psychological phenomena accompanying the use of these instruments and the main interest of the paper for the psychologist lies therefore in its systematic presentation of the ways in which the relation between the elements going to make up space perception may be modified by optical means.

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Ueber den Einfluss des Helligkeitskontrastes auf Farbenswellen.

ROSWELL PARKER ANGIER. *Zeitschrift f. Sinnesphysiol.*, 1906, XLI., 343-63.

In investigations of simultaneous brightness or color contrast four sets of conditions are possible: (1) a colorless field on a colored background; (2) a colored field on a colored background (color contrast); (3) colorless field on colorless background (simple brightness contrast); (4) colored field on colorless background. This last is necessary for discovering any relations eventually existing between brightness contrast and color perception, which is the object of Angier's work.

The conditions were varied experimentally in threefold manner; (1) change in brightness of the colored field alone by means of white light; (2) change in brightness of background alone; (3) simultane-

ous and equal change in the brightness of the background and colored field. The screen received its illumination from three sources: (1) a white light, falling directly upon it, illumined the background; (2) another white light, situated behind the screen, had its rays deflected so as to pass through an opening in the screen which was to constitute the colored field; (3) a third light, also behind the screen, whose rays passed through colored gelatine discs and then through the same opening as the second white light. The colors for the field were used in pairs [red-green and yellow-blue], one pair occupying the field at a time. The completed series, however, was worked through only with the red-green pair. Each pair was matched in brightness by the periphery of the light-adapted eye. The observer fixated the colored field and the experimenter gradually increased its intensity; then at the moment a color appeared at the threshold, the observer indicated the color and the half of the field which it occupied.

The question may be asked whether the match really remained perfect with the changing intensity of the light passing through the discs of pigmented gelatine. If not, the difference in brightness between the two halves might possibly affect by brightness contrast the threshold value of the color to be perceived and thus vitiate the results. Added to this is the possibility of the enhancement of the redness of the red by its complementary green, and vice versa. Another question which arises is this: Is not the intensity of the colored field actually higher than that of the background, when *e. g.*, in Table V, we have the value of the inner and outer white lights given as equal? For as a matter of fact the inner or colored field has added to the white value of the outer white light the white value of the light passing through the colored disc, so that the actual intensity of the inner field would be greater than that of the background. Hence a brightness contrast would result, yet the assumption is that there is no such contrast. The error arising from these conditions may, however, be very slight and may not materially affect the conclusions, especially since it was not attempted to cast these into a mathematical formula. Nowhere in the paper is there record made of false or uncertain judgments.

Angier thus summarizes his results: When a colored field decreases in brightness as a result of a contrast with a more intensely illumined background, the threshold value for the perception of color rises, and the rise of this threshold value is on the whole parallel with the increase of the brightness of the background above that of the colored field. A decrease in the brightness of the background below

that of the colored field appeared to have no definite influence upon the threshold. If on the other hand the intensity of the inner field alone or of both fields be simultaneously changed, we find a decrease or a rise of threshold values accompanying a decrease or a rise, respectively, in intensity. Hence, if the brightness of the colored field decreases as a result of contrast, the threshold value rises, but if the intensity of the colored field is itself decreased, the threshold value decreases. *I. e.*, if the brightness of a colored field or its background be increased by the addition of white light, the objective threshold value will be found to rise in both cases, although, in the first case, the brightness of the colored field subjectively *increases* and the degree of saturation *decreases*, while in the second case the brightness *decreases* and the degree of saturation *increases*.

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CARL RAHN.

Ueber den Einfluss des Sättigungsgrades auf die Schwellenwerte der Farben. F. P. BOSWELL. Ztsch. für Sinnesphysiol., 1907, XLI., 364-366.

Colored lights were projected on a disc of milk-glass by means of an incandescent lamp. The description of the method is rather meagre, there is no statement concerning the medium through which the colored lights were projected, nor concerning the size of the disc upon which they were thrown. One hundred determinations were made of the thresholds for each of the three colors, 50 tests being made with the colored lights alone, and 50 with the colored lights plus an admixture of a subliminal amount of white light. The complete series was carried out on two subjects whose eyes were thoroughly dark adapted.

Results. — The threshold was lowered in every case by the addition of white light, the average amount of decrease being, for the first subject, *green* 30 per cent., *red* 19 per cent., *violet* 34 per cent.; and for the second subject *green* 45 per cent., *red* 26 per cent., and *violet* 18 per cent. The results seem to justify the conclusion that, at least in the case of the two subjects tested, the threshold of a color is lowered by the admixture of white light. It is to be regretted that the descriptions of the apparatus and general method of procedure is not more complete and that the determinations were not made on a larger number of subjects.

The explanation offered by Dr. Boswell for his results is that the white light increases the general sensitivity of the visual organs in such a way that they are more readily affected by a color stimulus.

BRYN MAWR COLLEGE.

GRACE M. FERNALD.

FATIGUE AND PRACTICE.

The Relative Effects of Fatigue and Practice Produced by Different Kinds of Mental Work. J. H. WIMMS. Brit. Jour. of Psychol., 1907, II., 153-195.

This paper is an extended abstract of a thesis investigation; its first aim is found in the writer's interest in questions relating to fatigue and practice in school work; the second is an attempt to carry the work of Oehrn a step farther by using mental work of greater homogeneity than Oehrn's. The author assumes this last condition satisfied by addition and multiplication tests based on Kraepelin's *Rechenhefte*. To round out Oehrn's method, the writer follows Hylan and Lindley in the arrangement of the experiment.

In the additions, each pair of digits was added and only the unit digit of the sum written, to lessen muscular fatigue. In the multiplication tests there were three series, consisting of the multiplication of two, three, and four digits respectively. In both addition and multiplication the plan followed was a pauseless series, twenty minutes in length, a second series of two ten-minute periods separated by a rest period of ten minutes, and a third series with a rest period of twenty minutes intervening; these were given twice a week, making a total of thirty-six tests.

Twelve boys from fourteen to sixteen years of age acted as subjects. They were selected with regard to the regularity of their home life. The multiplication of two and four digits constituted a second research, with a different group of boys and in the following school year. The maximum of attention and interest was obtained by awarding prizes to those who worked 'most consistently throughout.' The author, as their regular instructor in mathematics, gave the tests; thus, 'the results . . . give a very good indication of their regular working capacity.' No mention is made of the work of Ebbinghaus and Thorndike on this point.

The discussions and conclusions are grouped under the headings, 'The More Favorable Pause and the Effects of Incitation,' 'Absolute Amount of Work Done,' 'Improvability,' 'Retentivity of Practice,' and 'Fatiguability.' Both researches give almost 'identical results.' The shorter rest pause proves more favorable with the harder tasks than with the easier. As a rule those boys whose absolute amount of work is greatest in the easier task also stand highest in the more difficult; the coefficient of correlation is .58; probable error .12. Improvability is greater with the harder task, and does not correlate with the absolute amount of work done; in the additions R is .37; in the

multiplications .22. Retentivity of practice (not retentiveness) is probably greater with the harder work, R equals .33. At the outset, fatiguability is greater with the harder task, but this relation reverses, and the coefficient for the whole relation of additions with multiplications is .2. Similarity of degree in improbability and retentivity of practice is as apt to occur as either type of dissimilarity; a result contrary to the conclusions of Kraepelin and his school. High improbability with low fatiguability or the reverse is more common than a similarity in tendency, a point in agreement with Kraepelin's work (p. 190 states this, while p. 178 f. shows an equality). An inverse relationship is apparent throughout between retentivity of practice and fatiguability. Improbability in the multiplication of two digits compared with that in the multiplication of four digits yields R equal to -0.13 .

To calculate results, the author uses principally the methods devised by Hylan and Lindley. In determining the R , Spearman's 'foot-rule' method is tested, and a comparative table shows the 'foot-rule' calculation as accurate as, and far easier of application than, the usual r method. To determine fatiguability, the writer suggests that after the more favorable pause is found, fatiguability may be easily calculated by comparing the amount of work done in the second period of the experiment containing this more favorable pause. The reviewer can only suggest here, that the danger of over-simplification is as great in the one case as is the probability of error in the other; 'Incitation' and Antrieb are varying factors, to mention no others, that influence results in the necessarily serial order of this type of experiment.

The introspective notes of the pupils, written in answer to a prepared set of questions, indicate in over half the cases a 'sense of increasing fatigue'; in some cases muscle fatigue, one reports a 'mental fatigue,' weariness, a desire to sleep, worn-out feelings, muddled conditions, etc. are reported. Liability to distraction is reported for the easier tasks, but no statement on this point is possible for the multiplications, on account of conflicting testimony. Concentration of attention is greater for the harder tasks, the other could be done 'mechanically.' No introspective report is made of errors, nor does the writer mention them in discussing the numerical results or in ranking his subjects.

To the reviewer, the paper shows possibilities in applying Oehrn's simple addition method to school work; though strangely enough teachers had so far failed to test it. This is the first test of the method outside the Munich laboratory, and ought to have been checked by

adult work at the same time; as it is, however, we note conclusions somewhat at variance with those results. Work done in this laboratory during the past year confirms some of these conclusions and points to the discovery of other variants. The work reported is not psychologically error proof, due principally to the class of subjects used.

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REACTION AND THOUGHT.

Ueber die Willenstätigkeit und das Denken. NARZISS ACH. Göttingen, Vandenhoeck & Ruprecht, 1905. Pp. 294.

In the author's view, experimental investigation of the will has made little progress because of the lack of a suitable method. In reaction experiments the chief stress has been laid on time values and although several investigators, especially Martius, Dwelshauvers, Münsterberg and Wundt, have shown that a serious regard must be paid to the psychological factors involved, no one has, as yet, made a thoroughgoing analysis of them.

In this work the attempt is made to use the method of 'systematic experimental self-observation.' This consists in occasioning experimentally in the subject certain mental experiences that are then at once subjected by him to a careful description and analysis, aided by appropriate questioning from the conductor of the experiment. Each experiment has three temporal divisions: (1) the preparatory period (Vorperiode) — the time elapsing between a signal that gives notice that the stimulus to be reacted to is about to occur, and the coming of the stimulus itself; (2) the main period (Hauptperiode) — the time between the application of the stimulus and the reaction to it, this time embracing the mental processes under introspective investigation; (3) the after-period (Nachperiode), which immediately follows the reaction. During this period the psychic processes of the 'Hauptperiode' are to be analyzed and described. The subject knows at the beginning that he is to make this analysis, but during the main period he has simply to perform his reaction as quickly as possible, and not to analyze his mental state. In case analysis is, during the main period, detected by its interfering with the reaction, the experiment is thrown out. With practice such cases become rarer. The after-period is usually one of several minutes.

The reaction tests actually used in the experiments that Ach reports were the ordinary ones, the only claim to originality being in the thorough carrying out of the method of systematic self-observation.

Between sense-stimulus and reaction no act of will was found to be necessary; for, since an initial purpose to make the movement was present, the kinæsthetic idea is ready to go over into movement so soon as the associated stimulus occurs; the act of will takes place, therefore, not after the appearance of the stimulus, but before the experiment begins (p. 119). The essential distinction between muscular and sensorial reaction does not depend, according to Ach, on the concentration of attention on the stimulus on the one hand, or the movement on the other, but on the subject's intense purpose to react either as quickly as possible or only when he has fully perceived the stimulus (p. 122). The term 'choice-reaction' is, furthermore, a misnomer, since no choice takes place in the main period; there occurs simply the interposition of an intermediate member between the perception of the stimulus and the reaction, namely, the presence in consciousness of the acoustic-kinæsthetic idea of the movement of the appropriate finger, or, if different stimuli are to be reacted to, the movements of different fingers. The movement may immediately follow the intermediate member or be preceded by 'intentional movement sensations' by which the finger is put in a state of preparedness for movement. These disappear with practice. 'Intentional movement sensations' are peculiar sensations in the muscle-organs that point out in consciousness the direction in which a movement shall occur. There is, however, no necessity of the movement's occurring in the organs whence the sensations arise, or, indeed, of its taking place at all (p. 151).

The effect of an idea of the goal is discussed by the author at some length. The effects proceeding from such an idea and causing a determination in accordance with the meaning of the 'goal,' are called the 'determinating tendencies' (*determinierende Tendenzen*). The effect of the stimulus is different, according to the 'tendencies,' although, as in post-hypnotic suggestion, one may be no longer conscious of their determining influence.

Although the book is well worth reading, the results obtained and the views given might, perhaps, have been somewhat condensed in the telling of them.

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DIZZINESS.

Ueber Nachempfindungen im Gebiete des kinaesthetischen und statischen Sinnes. Ein Beitrag zur Lehre vom Bewegungsschwindel (Drehschwindel). HANS ABELS. Zeitsch. f. Psychol., 1906, XLIII., 268-289, 374-422.

The impulse to the present study was found in observations and studies upon seasickness which the author made as a physician of the Austrian Lloyd. Seasickness has been looked upon as a form of movement dizziness and shows the same characteristics. The first facts to present themselves with respect to seasickness are the striking individual differences and the influence of habituation. These are given careful consideration by the author as points of importance in the whole subject of movement sensations with their after-sensations and of turning sensations after turning movements. 'Nur dieses Gefühl des Verwirrtseins bezeichnet der Sprachgebrauch als Schwindel.' The author holds that seasickness and movement dizziness are essentially of the same character and so reviews all the work that has been done upon movement sensations, after-sensations of movement, and illusions of movement to find an interpretation for dizziness in general. He criticises Mach and Breuer for holding that turning sensations of short duration can have after-sensations of long duration and repudiates the idea that dizziness can be due to a functional peculiarity of the vestibular apparatus or to a mechanical imperfection or incompleteness of the statical end organ. He reviews Jensen's experiments upon galvanic dizziness and shows that this is due alone to the long stimulation of the skull. His main contention is that only long durations of stimulus can have long after effects and correlates this with the after-dizziness from long rotations. This principle, he claims, is valid in the general physiology of the senses and takes Mach to task for employing special principles in his explanation of results obtained in the study of progressive acceleration. Progressive movements as well as continuous rotations produce exhaustion of the movement sensation just as continuous stimulation in other sensory fields. The up-push felt in the arm which has held a pail of water that has been allowed to flow out rapidly, reversed motion perceived in trains whose speeds are rapidly decreasing or in elevators coming to a sudden stop, and the sensations of heaviness after allowing the water to flow quickly from a bathtub, are explained by the fact that all motion is the result of opposing muscular tendencies and that under the unusual circumstances one side of the mechanism is fatigued and perhaps the other side is rendered hypersensitive by the long absence of the usual stimu-

lation. To progressive movement habituation has taken place in daily experiences, but not so for rotations. Hence the prominence of after-sensations in the latter as compared with the other. Habituations to rotation movements are possible and are found in experienced dancers and skilled skaters. The after-sensation from rotation comes only with long stimulation, — this he bases upon his own experiments with rotating human subjects and doves, — and cannot be due to the sudden or momentary shifting of the cupula as Breuer supposes or to the waving of the auditory hairs or ossicles with Brown. In this study of rotations he finds two sensation elements, the swinging sensations that give speed and mediate position of rotation axis, etc., and the sensation corresponding to angle acceleration which registers meaning, direction and change of rate. The latter is always of short duration. These sensations are usually combined in daily life, which furnishes only short turning movements, but under experimental conditions they may be separated entirely from one another. Lasting rotations are entirely abnormal and dissociate these elements by calling them out in different measures so that to the higher centers a complex of sensation elements are mediated that stand in unaccustomed and often opposing relations. After-dizziness never attains to the clearness of a real sensation as it should on Breuer's hypothesis. These two sensation elements have after-sensations, and it is to the unusual combinations of these in the higher centers that dizziness is due. The author rests his argument upon a very closely critical examination of the work of others and makes only a subordinate use of his own experimental studies. He scarcely satisfies the hope that he raises at the beginning by mentioning seasickness. The reader is led to expect some light upon the question of the disturbance of the vomiting center by the arousal of dizziness sensations. However, the work has been carefully done and one cannot help but be impressed with the strength of the argument, especially with the negative conclusion towards the hypotheses of Mach and Breuer.

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BODY AND MIND.

Leib und Seele : Darstellung und Kritik der neueren Theorien des Verhältnisses zwischen psychischem und physischem Dasein.

R. EISLER. Leipzig, Barth, 1906. Pp. 215.

The author takes up Dualism, Materialism, the Identity theory, Interactionism and Parallelism, giving an exposition and criticism of

each in turn, and concluding with a brief discussion of the problem of immortality upon which he thinks his own spiritualistic phenomenalism throws new light.

Like most discussions of the mind-matter problem the validity of the argument turns on certain underlying assumptions:

1. The assumption of the priority of self-consciousness (cf. p. 93 f.). This leads the author to a spiritualistic monism or panpsychist parallelism. Reality is ultimately psychical in its nature. Physical objects are phenomenal manifestations of psychical subjects as they appear to one another.

The same presupposition crops up in the insistence on the more real and more immediate character of consciousness (cf. p. 47 f.). This results from confusing the first and the third person's points of view.

2. Closely connected with this is the assumption of the existence of unconscious mental states which parallelism finds so helpful in eluding its difficulties and so useful in covering up its obscurities (cf. p. 100 f.). Not all the psychical is in consciousness, he says. The psychical correlates of certain physiological processes are unknown to us. He admits that there is no mental process (not even the so-called higher intellectual activities) which has not its physical basis or counterpart, and he sees that this conception does not necessarily imply materialism, but he does not see that by this admission he would have to reconsider his metaphysical idealism.

3. The assumption of the disparateness and incomparability of mind and matter (cf. p. 45 and Cap. IV. *passim*). The psychical differs from the physical in that it consists of qualitative whereas the physical consists of quantitative relations. The dictum recurs here (which so few writers have had the courage to challenge) that the psychical and the physical are characterized by different properties or qualities. Physical properties like extent, solidity, color, heat, movement cannot be predicated of the psychical.

The sensation 'red' is not itself red, the sensations of spatial extent are not themselves extended. In short, "The determinations and changes of the contents of consciousness or experience are not identical with the determinations and changes of experiences as states or acts of the subject" (pp. 15-16).

But a dualism of content and process is not much improvement on an ontological dualism, if it is taken statically.

4. The assumption of the parallelism of the psychical and the physical. The author seeks to reconcile interactionism and parallelism

on epistemological grounds. The physical world is phenomenal only — a manifestation of what in reality is psychical in character. The causal interaction between soul and body is therefore an interaction between different levels of the psychical, while the parallelism of the psychical and the physical is simply the duality of the reality and its phenomenal appearance. The parallelism of consciousness and brain states is the result of an interpsychical causal relation (cf. p. 147 f.).

H. HEATH BAWDEN.

UNIVERSITY OF CINCINNATI.

BOOKS RECEIVED FROM SEPTEMBER 5 TO OCTOBER 5.

National Educational Association. — Fiftieth Anniversary Volume, 1857-1906. Winona (Minn.), Publ. by the Association, 1907. Pp. viii + 949.

Index by Authors, Titles, and Subjects to the Publications of the National Educational Association for its First Fifty Years, 1857 to 1906. Winona (Minn.), Publ. by the Secretary, 1907. Pp. 211.

The Ego and Empirical Psychology. W. B. PILLSBURY. Reprint from *Philosophical Review*, Vol. XVI, No. 4; July, 1907. Pp. 24.

Contemporary Criticism of Friedrich Nietzsche. F. S. BAKER. Reprint from *Journal of Philos., Psychol. and Sci. Methods*, Vol. IV, No. 15; July, 1907. Pp. 16.

Rudolf Eucken's Philosophy of Life. W. R. BOYCE GIBSON. New York, Macmillan Co., 1907. Pp. 182. \$1.40.

Outlines of Psychology. WILHELM WUNDT. Translated by C. H. JUDD. Leipzig, Engelmann, 1907; New York, G. E. Stechert & Co. Pp. xvi + 392. Mk. 8.

Twenty-fifth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution. Washington, Government Printing Office, 1907. Pp. xxix + 296, pl. cxxix.

NOTES AND NEWS.

The Second Annual Conference of Teachers of Psychology in Normal Schools and Colleges was held May 10-11 in Milwaukee. Milwaukee-Downer College and the Milwaukee Normal School were the hosts, the sessions of the conference being divided between the two.

This conference was organized a year ago. The constituency is at present drawn from Michigan, Wisconsin and Illinois.

The first session of the meeting was devoted to a discussion of the place of genetic and functional psychology in the curriculum. Papers were read by Professors I. E. Miller of Milwaukee, and A. W. Tretien of Carroll College and Dr. D. P. McMillan of the Child Study Department of the Chicago public schools. At the next session papers were presented by Professors W. C. Gore of the University of Chicago, J. H. Farley of Lawrence University and W. D. Scott of Northwestern University, discussing the peculiar difficulties which beset the presentation of elementary psychology and suggesting various specific methods for enriching and vitalizing the content of such courses. In the evening Professor Jastrow of the University of Wisconsin delivered a public address entitled 'Psychology: clinical and academic.' At the final session the following papers were presented: 'A physiological interpretation of feeling,' by Professor Harvey, of the Michigan Normal College; 'Suggestions toward a real educational psychology,' by Professor Irving King of the University of Michigan; 'Æsthetic factors in education,' by Professor J. T. McManis of the Western Michigan Normal School; 'The value of a biological point of view for educational psychology,' by Professor J. R. Angell of the University of Chicago. It was voted to hold the next regular meeting at Chicago in 1909.

IN connection with the appointment of Dr. C. Judson Herrick to a chair of anatomy in the University of Chicago, we note the removal of the editorial offices of the *Journal of Comparative Neurology and Psychology* from Granville, Ohio. The new address is Hull Laboratory of Anatomy, University of Chicago.

AN American editorial board has been organized for the *Hibbert Journal* to co-operate with the present British board. We note the names of Professor Josiah Royce, of Harvard University, Professor G. H. Howison, of the University of California, and Professor A. O. Lovejoy, of Washington University.

PROFESSOR H. HEATH BAWDEN, of Vassar College, has been appointed to a chair of philosophy in the University of Cincinnati.

MR. HERBERT H. WOODROW, last year demonstrator in the Psychological Laboratory at Princeton, has been appointed lecturer in psychology at Barnard College, Columbia University.

DR. CLEMENT L. VAUGHAN, who has been working for a year in Professor Nagel's laboratory at Berlin, has been appointed demonstrator in the psychological laboratory at Princeton University.

DR. DANIEL E. STARCH, formerly instructor in psychology at the University of Iowa, is appointed instructor in experimental psychology at Wellesley College. Dr. Starch is also carrying on work in the Harvard Psychological Laboratory.

PROFESSOR HOWARD C. WARREN, of Princeton University, has returned from Europe, where he has been spending the summer.

THE following items are gathered from the press :

DR. HENRY W. STUART, of Lake Forest University, has been appointed assistant professor of philosophy at Stanford University.

DR. ERNEST ALBEE, has been advanced to a professorship of philosophy at Cornell University.

DR. J. B. PORTER has been promoted to an assistant professorship in psychology at Clark College.

DR. GEORGE SANTAYANA, assistant professor of philosophy at Harvard University, has been appointed professor of philosophy.

DR. PERCY L. HUGHES has been appointed assistant professor of philosophy and psychology at Lehigh University.

MR. A. B. SUTHERLAND has been appointed assistant in philosophy at the University of Wisconsin.

MR. GREGORY D. WALCOTT, Ph.D. (Columbia), of Blackburn College, has been elected professor of philosophy in Hamline University.

DR. F. LYMAN WELLS, lecturer in psychology in Columbia University, has been appointed pathological psychologist in the McLean Hospital, at Waverley, Mass.

EDWIN G. DEXTER, Ph.D., professor of education in the University of Illinois, has left the university to take up his duties as commissioner of education in Porto Rico.

PROFESSOR W. J. NEWLIN, associate professor of mathematics and psychology at Amherst College, has been appointed associate professor of philosophy. He will continue the work which he has carried on since the death of Professor Garman.

MR. ROWLAND HAYNES, associate at the University of Chicago during the past year, has been appointed instructor in psychology at the University of Minnesota. The psychological laboratory there is to be reopened under the supervision of Professor Miner.

DR. CHARLES HUGHES JOHNSTON, substitute during the past year for Professor H. H. Horne at Dartmouth College, has been appointed assistant professor of the philosophy of education at the University of Michigan.

DR. JOHN B. WATSON, of the department of psychology at

Chicago University, has been spending some time at the Station for Marine Biology of the Carnegie Institution at Dry Tortugas, where he has been studying the habits of sea-gulls.

ON THE occasion of the celebration of the seventy-fifth anniversary of the foundation of Lafayette College, the degree of doctor of letters was conferred on Professor Hugo Münsterberg, of Harvard University, and the degree of doctor of laws on Professor J. McKeen Cattell, of Columbia University.

PROFESSOR KUNO FISCHER, professor of philosophy at Heidelberg, died on July 5, at the age of eighty-three years.

THE death of Dr. Charles Féré, physician at the Bicêtre, Paris, and well known for his researches in neurology and psychiatry, was also reported during the summer.

DR. N. ACH, docent for psychology at Marburg University, has been called to the chair of philosophy there.

DR. CHARLES SPEARMAN has been appointed reader in experimental psychology in University College, London.

PROFESSOR CARL STUMPF has been elected rector of the University of Berlin.

PROFESSOR WILLIAM JAMES has been elected a corresponding member of the British Academy.

THE General Board of Studies of Cambridge University recommends, in place of the present lectureship in physiological and experimental psychology, the establishment of two lectureships, one in the physiology of the senses and the other in experimental psychology.

Corrigenda.—In the article on 'The Physical Basis of Conduct,' by E. G. Spaulding, which appeared in the September BULLETIN:

p. 274, l. 14, *for* conservative *read* conservation;

p. 277, l. 26, *for* correct one *read* the correct one;

p. 283, note 2, l. 4, *for* Now *read* Here.

THE
PSYCHOLOGICAL BULLETIN

PROFESSOR ORMOND'S PHILOSOPHY.¹

BY PROFESSOR ARTHUR O. LOVEJOY,

Washington University.

American philosophy has been enriched during the past dozen years by a considerable and a rapidly increasing number and an almost equally great diversity of philosophical systems. Royce, Ladd, Howison, Fullerton and Santayana, to mention no others, have published books dealing with fundamental problems so comprehensively, or so distinctively, or both, as to take rank among the substantial achievements of metaphysical architectonics. With the appearance of the second of Professor Ormond's two treatises, another system, covering the whole field of philosophical issues in an essentially independent and personal manner, must be added to the roll. The future historian of American thought is likely to find ample material showing how — and how differently — the universe impressed reflective and systematizing minds of our time. As personal confessions, and as additions of more or less new types to mankind's collection of world-schemes, all of these are of profound interest and instructiveness. But a reviewer called upon to consider the latest of the series, is vexed by a haunting remembrance that the others also exist, and that they markedly disagree with one another and with the newcomer. Philosophy with us is assuredly no barren virgin; but she is still subject to the reproach of rearing a singularly inharmonious and fratricidal brood. To one who cherishes some hopes of philosophy as a potential science, the remembrance of such facts breeds a doubt whether the tendency to system-making is a thing that ought greatly to be encouraged. Might not the dignity and good standing of philosophy be increased by a dimi-

¹ 'Foundations of Knowledge,' 1900; 'Concepts of Philosophy,' 1906. By Alexander Thomas Ormond, McCosh Professor of Philosophy in Princeton University. N. Y., Macmillan. In citations, the former work is here referred to as *FK*, the latter as *CP*.

nution in fecundity and a more persistent — and successful — effort to compose the differences among her present offspring? For the ancient but unobliterated blot upon the good name of the science is the inability of philosophers to convince one another, or to agree even upon points of primary importance. It is unhappily true that the appearance of each stout, new volume of systematic philosophy is only so much additional material for irony to those who sit on the seat of the scornful. Professor Santayana, for example — one of the most recent contributors of a general scheme of things before Professor Ormond — gives us, under a somewhat mystifying veil of humanistic sympathies, a thoroughgoing doctrine of mechanism and epiphenomenalism, and is sure that consciousness is wholly inefficacious, a mere 'lyric cry in the midst of business'; Professor Ormond is equally clear that 'agency is the central thing in the universe,' and that 'consciousness is the agent of agents, revealing in its activity the truth and significance of the inner nature of things.' Professor Howison, who would agree with the latter view, insists that each conscious self must be wholly independent in its activity, and that the freedom and the responsibility of a self is incompatible with the idea of its being created or produced by any other; Professor Ormond holds that if the world is to be 'prevented from lapsing into an irrational chaos,' all existing things, including selves, must be grounded in, and 'instituted' by, 'the all-comprehending purpose of an eternal consciousness.' Professor Royce would, in turn, agree with this, but would maintain that such a conception can be made intelligible and free from self-contradiction only if the finite selves and their states and relations be construed as included, consubstantial elements in the being of the eternal consciousness; Professor Ormond is certain that "the self is not merely a 'piece of the absolute,' nor is the self simply a specialized purpose of the absolute"; he even finds that "the complete identification of the self with the whole or a part of the absolute is inconceivable."

While, then, we welcome a new and important systematic treatise, we may also lament that the first and most obvious result of its publication is to intensify the discord of metaphysical voices, and so to give fresh sanction to the suspicions of the profane that constructive metaphysics is mere logomachy or, at best, mere poetry. And we may improve the occasion to urge that what we now most need in philosophy is further patient, analytical, rigorously methodical study in the logic of the fundamental concepts, with no haste to be constructive or synthetic. And, in order that such study may not be scattering and ineffectual, we need, emphatically, some sort of organization of

philosophical inquiry. Our technical associations, with their wearisome successions of disconnected papers, fail lamentably to do what they might to get our philosophers to thinking in common terms upon common problems—to promote real and fruitful dialectic. If metaphysicians as a class cared as much for the establishment of truth as, say, the trade-unionist cares about the advancement of the interests of his order, they might even consent to some limitation of their personal independence and initiative in reflection, and agree together to devote their principal effort for a year to thinking—and thinking together, by means of a careful, open-minded, analytical comparison of notes—upon some one, specific, precisely defined question.

All this has no more special pertinency to Professor Ormond's work than it would have to any other newly-appearing system. It has, indeed, less pertinency than it might have to some others, for Professor Ormond seeks conscientiously, if not with invariable success, to profit by the reflection of earlier thinkers, and does not ignore the history of philosophy. His two books—to come at last to the consideration of them—do not, as might be supposed, constitute consecutive stages in a sequential argument. They rather begin at separate points and proceed by paths usually distinct, but often coincident, to a common end. The *Foundations of Knowledge* does, however, appear to be a needful preliminary to the later book, since it contains definitions of certain terms, and a partial explanation of the criteria of truth used in the author's constructive procedure, without which the other work would be more or less unintelligible. The converse of this, however, is almost equally true; for it must be said that sequential exposition of ideas is not Professor Ormond's greatest gift. It is often necessary—for the reader who is determined to apprehend—to collate passages from scattered chapters in both volumes before getting a complete or a clear understanding of the writer's position. And in this effort the reader will get no help from the absurd indexes which the publishers have provided. In these useless appendages such important rubrics of Professor Ormond's discussion as 'æsthetic categories,' 'causation,' 'metaphysical standpoint,' 'science,' 'self,' are unmentioned; passing metaphors or allusions, such as 'Procrustean bed,' 'Europe,' are solemnly included; while 'the mental and physical,' and 'the ethical synthesis,' are conveniently catalogued under the letter T.

The distinguishing scope and the broad outlines of the two volumes, however, are sufficiently clear. The *Foundations of Knowledge* begins on the subjective side, by attacking the familiar problems of post-

Kantian epistemology; starting out with an analysis of the notion and implications of experience, and continuing through a species of 'deduction of the categories,' the argument [passes in the usual manner, though with original and distinctive reasonings, into a constructive metaphysics and theology. The *Concepts of Philosophy* — which to many, and especially to non-professional readers, is likely to seem much the fresher and more interesting book of the two — finds its point of departure in a significant and serious feature of the contemporary intellectual and religious situation: the difficulty, in view of the impressive triumphs of the methods and conclusions of physical science, of finding any important or functional place in reality for consciousness, with its incorrigible sense of its purposive and active relation to its external world — or any response in that world to the religious demand that the environing and conditioning universe shall be conceivable as in some degree congenial and analogous to the thinking, purposing and willing mind. The book begins by seeking to establish the indispensability and (apparently) the *a priori* validity, for natural science itself, of the principles, not only of necessary causality, but also of 'agency,' and 'substance' or 'ground.' But it goes on to the contention that these purely dynamic categories are inadequate, and fail to give, even to the theoretical reason, any satisfying and 'rational' explanation of phenomena. They must, accordingly, be supplemented by a teleological, which means, in the last analysis, a personalistic explanation of the real nature of the ultimate and unitary agency 'symbolically' manifested in the dynamic processes of the physical world. This does not mean that teleological explanations are to be obtrusively interpolated into the hypotheses of science; it means merely that the whole system of scientific facts must be 'reinterpreted,' and viewed in its entirety from a higher and more fully explanatory point of view, which Professor Ormond calls the standpoint of metaphysics. The general character of the final metaphysical outcome — the conception of the nature, and the relation to our minds, of the ultimate transcendent reality — is roughly indicated by those antithetic relations of Professor Ormond's doctrine to the views of certain other metaphysicians, which have already been set forth. The system as a whole contains a good deal of Lotze, and apparently a little of Martineau; but it has entirely characteristic qualities of its own, both in its processes of proof and in the distribution of emphasis in the eventual conclusion.

To Professor Ormond's processes of proof more particular attention ought now to be devoted. For his work professes to be more than — what at least it is — a sane, genial and optimistic personal guess

at the riddle of existence. It has the pretension of being a convincing and verifiable body of scientific truth; and it deserves to be treated correspondingly. One must therefore ask, primarily, what cement it is that Professor Ormond uses in the construction of his rather elaborate and high-soaring and, undeniably, attractively designed edifice of ontology. In other words, how does the author define and justify the criteria of *a priori* knowledge by means of which he conceives the attainment of demonstrable truth in metaphysics — and, in particular, of those conclusions which he himself affirms — to be possible? I cannot think Professor Ormond's answer to this fundamental epistemological question to be a favorable example of the rigor of the game. His treatment of it appears to me to contain a regrettable amount of ambiguity or infelicity in expression and technical nomenclature, of looseness in definition, and of confusion in classification. He begins by attempting to clear up the distinction between knowledge and belief; by the latter, of course, he means (though he hardly employs terms which make such meaning plain) 'mere belief,' since knowledge cannot be anything but belief *plus* some additional characteristic. 'Knowledge-judgments,' then, are those which have 'the quality of objective coerciveness.' Such a judgment 'leaves the mind no option but to adopt it.' Belief-judgments, on the contrary — *i. e.*, all judgments which do not come up to the standard of knowledge in the strict sense — lack this coerciveness. 'There is a sense of objective freedom or option attaching to belief,' and this survives even when the holding of the belief is — through the influence of habit or strong feeling — subjectively unavoidable. And since it is not beyond the reach of possible doubt, a belief-judgment, when it becomes at all reflective, 'carries with it the consciousness of having been determined, to some degree at least, by considerations of practical interest or value.'

Now, Professor Ormond does not seem to me to analyze adequately this conception of the criterion of knowledge as consisting in 'coerciveness,' or to develop and apply it clearly or consistently. In the first place, there is a familiar distinction which has long been recognized as differentiating the truly 'necessary' judgment of knowledge from a mere irresistible conviction — a difference which Professor Ormond does not make very luminous. How does a 'coercive judgment' differ from an 'irresistible belief' — particularly when the latter is expressly credited with 'a form of coerciveness' (*FK* 308)? Certainly the contrast is not made any clearer by calling the former kind of coerciveness 'objective.' Coerciveness as such can never be anything but a subjective phenomenon; my mind either feels compelled

to affirm a given proposition or it does not; and it does not appear how there can be either differing degrees or differing kinds of such subjective compulsion. But epistemology, since the time of Leibniz, has been familiar with an *a priori* test of the truth of a judgment which exhibits with perfect clearness the nature and ground of the contrast which Professor Ormond brings out only confusedly and unconvincingly. This is the test, not by coerciveness for belief, but by coerciveness for conception. The test rests upon the apparent fact — verifiable only as a matter of subjective experience — that between certain concepts, apprehended as distinct from one another in meaning, there subsist for our minds relations of repugnancy or impossibility, such that no two such concepts can be thought together as joint predicates of a common subject without reducing that subject to meaningfulness, to a mental nonentity, a *nihil negativum irrepræsentabile*, as Kant called it. 'Necessary' judgments are accordingly characterized, not simply as those of which the opposite is unbelievable, but as those of which the opposite is inconceivable — *i. e.*, involves the union in a single concept of two reciprocally destructive predicates.

That so competent a logician as Professor Ormond should overlook this primary and essential distinction between the believable and the conceivable, is singular. One *obiter dictum* (*FK* 307) indicates the probability that he really, if vaguely, means by 'coerciveness' the 'impossibility of conceiving' one notion 'apart from' another. But in general this is neither made unequivocally clear to the reader, nor consistently adhered to. If, however, the author intends to present the 'inconceivability of the opposite' as the ultimate criterion of *a priori* demonstrable truth, and the basis of all verifiable metaphysics, certain questions arise which call for settlement from the metaphysician before his further progress is warranted. Professor Ormond ignores these questions; and he therefore marches on to his metaphysical conquests leaving unsubdued fortresses in his rear. The first question is whether any such relations of impossibility between concepts are really 'synthetic.' If this be convincingly answered in the affirmative, it would next be pertinent to consider (since some philosophers profess scepticism upon this point) whether a subjective necessity of thought, be it never so necessary, can be regarded as equivalent to information about an 'objective' and 'transcendent' reality. And supposing this sceptical cavil to be effectually disposed of, the third and (for present purposes) most significant question arises. Assuming that the necessity of thought which results from the inconceivability of the opposite of a proposition is a valid criterion

of knowledge *a priori*, is it not the only such criterion? Is it not the one and only example of true and persistent coerciveness? Can I not intellectually doubt (*more Cartesiano*) all general propositions the terms of which I can actually conceive together? And if so, can I strictly be said to *know* the truth of any general proposition which cannot be unmistakably verified by this test of conception? Must not all affirmation beyond these (probably narrow) limits rest either upon non-rational habit and ease of association, or upon voluntary postulates?

The misfortune of Professor Ormond's neglect to deal with these questions, and to define unequivocally the fundamental criterion of knowledge, becomes apparent when one considers his development of his general account of the nature of knowledge into its detailed specifications. Knowledge-judgments, having been ambiguously defined as above, are divided into two main classes (*CP* 122 f.): (1) 'judgments of cognition' (the nomenclature is curiously confusing) or intuitive judgments, and (2) judgments of 'objective' or 'rational necessity.' The first class is subdivided into two species: (*a*) 'factual,' and (*b*) 'constructual' judgments. The former species consists of judgments 'founded on' immediate perception. Here another confusion is apparent. The only judgments based upon perception and purely factual that can be considered coercive and intuitive, relate merely to the content, at any given moment, of immediate sense-presentation, or else to the primary certitude of self-consciousness. But this mere awareness of the momentary data of sensation and feeling gives no epistemological warrant for any universal proposition concerning matters of fact — concerning experiences lying beyond the present moment and differing from it in content and relations. Yet Professor Ormond speaks of the 'factual' (and therefore, by his classification, necessary, intuitive, and *a priori*) 'certitude of general propositions' in physical sciences based upon 'an observed uniformity in the behavior of facts which the proposition embodies.' This, surely, is a strange confounding of the empirical generalizations of science with *a priori* intuitions. The author seems, in fact, to confuse knowledge in the ordinary, practical sense — the sense in which we are said to know that 'iron filings behave in a uniformly opposite manner when exposed to the positive and negative poles of a magnet' — with knowledge in the epistemologist's (and even the author's own) sense, in which it means judgments coercive beyond the reach of the most resolute doubt. If we have learned anything since 1739 it is that the universal propositions called the 'laws' of natural science are not necessary but contingent, and are therefore not in the strictest sense 'known'

to be true, but are merely special applications of an accepted and (in past experience) practically serviceable system of interconnected postulates. Even if the rule of causal uniformity be admitted to be an *a priori* principle, it has no logical power to lend its mantle of necessity and apriority to any specific, empirically discoverable case of uniformity in any particular science. Even though it be an indubitable *a priori* truth that the same antecedent must always be followed by the same consequent, it is not so known (to any finite mind) that the total antecedents *are* the same in any two cases of seemingly similar phenomena. There is, therefore, a very plain inconsistency in Professor Ormond's classification; the judgments that he cites as examples of 'factual' knowledge are not intuitive; and they are not (even by his own definition) knowledge.

Passing to the second species of intuitive judgments, the 'constructual,' a further difficulty appears. While in the case of the class just mentioned the species — factual judgments — seemed to lack the characters of the genus — intuitive judgments — in this case there is reason to regard the species as coextensive with the genus. For a 'constructual' judgment is one 'affirmed on conceptual data' and expressing (if I interpret rightly the somewhat obscure language of *CP* 122-7) the implicit relations of certain fundamental concepts to one another. But, as we have seen, it appears questionable whether any necessary or coercive universal judgments exist that are not 'affirmed on conceptual data' and do not express simply the implications of concepts.

But the chief obscurities present themselves when one turns to the second general class of knowledge-judgments,¹ *viz.*, 'judgments of rational necessity.' In the passage in which these judgments are talked about at length they are actually not defined at all; the reader is left to guess their nature from the context. 'Rational necessity,' in the ordinary sense, would seem (by Professor Ormond's view) to attach to the judgments of mathematics, but as these are referred to another class ('constructual intuitive') the reader is compelled to conclude that the term is here used in some peculiar meaning. In order to discover what that meaning is, how these judgments differ from the constructual, and why and in what sense they are held to be coercive,

¹To help the reader through this confusion, Professor Ormond's classification of judgments is here recapitulated:

- | | | | | |
|------------------------|---|--|---|---------------------------------|
| I. Knowledge-judgments | { | 1. Judgments of Cognition
(intuitive)
2. Judgments of Rational
Necessity. | { | a. Factual.
b. Constructual. |
|------------------------|---|--|---|---------------------------------|
- II. Belief-judgments.

the reader must search through a number of passages scattered through both volumes.¹ Such a search will indicate the probability that by 'judgments of rational necessity' Professor Ormond means judgments affirming the necessity of conceiving the universe as characterized by rationality. And 'rationality' is, with Professor Ormond, a word of special meaning. It signifies, in a general way, 'unity'; more specifically it is conformity with the 'principle of sufficient reason,' according to which reality is 'conceived as a unitary and self-centered system in which the parts or elements are connected with one another in relations of dependence and mutual influence' (*FK* 230). The requirements of this principle are, however, not fully met by the mere application to the data of experience of 'the dynamic categories'—*i. e.*, by the recognition that all phenomena are related through the processes of efficient causation and all substances through reciprocal interaction. For efficient causality alone, though it gives to each phenomenon a determinate and inalienable position in the whole to which it belongs, does not account for this determinateness itself, nor show any intelligible meaning in the whole as such (*CP* 91). This complete internal luminosity of the system, this ultimate intelligibility based upon the full and meaningful implication of each part in the whole, is gained only when we translate efficient into final causality, and conceive the whole as expressing purpose and prevision. "A theory of things which claims to be finally satisfactory must be one that contains an intelligible reason for their existence in the system to which they belong. We mean by an intelligible reason one that will not leave them to mere accident or blind fate." Without limiting the right of natural science to apply exclusively, to all particular facts, dynamic and even mechanistic modes of explanation, we must still reinterpret the whole universe of facts as the expression of a purpose realizing itself through volitional agency. And this is the work of metaphysics, the greater part of which depends upon these 'judgments of rational necessity.' "It is because some final meaning of things is rationally required, while no other kind of agency than a mental or conscious one can satisfy this demand, that certitude attaches to the metaphysical interpretation" (*CP* 131).

This makes tolerably clear the principal *content* of Professor Ormond's 'judgments of rational necessity'; and it brings more fully before us, also, what may be regarded as the central, as it is the most interesting and distinctive, contention of his philosophy. But what our author set out to do was to distinguish knowledge-judgments with

¹ *FK* 219-232, 237 f., *CP* 129-132, 176-186, 402-10.

respect to their epistemological nature, status and ground of validity, not with respect to the affirmations contained in them. If one asks the epistemologist's question, why and in how far certain judgments are known to be true, it is no answer to give an account of the subject-matter of those judgments. And the epistemological character of 'judgments of rational necessity'—and therewith the whole logical value of Professor Ormond's metaphysics—remains as obscure as before. Does or does not the author regard the 'rationality of the universe'—the applicability to things of the 'principle of sufficient reason' in both its dynamic and its teleological senses—as a necessary truth? Being classified as knowledge-judgments, these are presumably 'coercive'; and they are said to constitute a 'form of certitude.' But they are not intuitive; as they are not called 'constructual,' they evidently are not based upon the necessary implications of the meanings of the concepts involved; and it does not appear clearly that their opposites are held to be inconceivable. We are, in fact, told (though this takes them out of the class of 'knowledge-judgments' altogether) that 'there are strong reasons for regarding the metaphysical judgments as in general forms of the judgment of belief. But they are belief-judgments of a special type and find their analogies in the Kantian postulates of the practical reason' (*CP*, 134). And these judgments are even declared to be 'essentially æsthetic' in character. Out of all this it appears to be impossible for the reader to get any clear idea of the epistemological status ascribed to that class of judgments out of which the most distinctive and positive part of Professor Ormond's doctrine is built up. Whether the 'principle of rationality' is an intellectually demonstrable necessity of thought, or only a postulate to be adopted because any other conception of things, while 'it satisfies the intellect, leaves the emotional world in chaos' (*CP*, 409)—to this absolutely fundamental question our author offers no luminous or consistent answer. And whatever be his real and permanent view, he certainly offers no reasons which seem likely, in point of fact, to 'coerce' into agreement with him those who incline to another way of thinking. The 'rationality of the world,' in so far as it means merely the possibility of an ultimate teleological interpretation of phenomena, is doubtless a postulate to which profound emotional 'demands' in our nature point, and which we have, therefore, no good reason for rejecting. But where the same principle is invoked to justify the conclusion that our conception of physical causality contains more than the mere idea of uniform succession, or that physical science needs the notion of active substance, one remains uncon-

vinced; there seems no logical ground for such conclusions, and they certainly do not appear called for as practical postulates. One gathers plainly enough that Professor Ormond disagrees with Hume, or with James, who has just been telling us that, in the present state of the evidence, we have no reason to believe that the world expresses any complete unity of purpose or agency; but the arguments by which the disagreement should be justified are not easy to make out.

Professor Ormond's main line of reasoning thus lacks both clearness as to its epistemological basis, and probative force. The fact is the more regrettable because the starting point of his metaphysics is, as it seems to me, a pregnant one, containing much of what is true in pragmatism, and serving as a desirable offset to Santayana's recent revival of epiphenomenalism. Metaphysics, says Professor Ormond, 'has its vital roots in the form and substance of the emoto-volitional nature of consciousness.' In it, 'the internal standpoint of consciousness'—of a consciousness that thinks itself as planning and willing and acting in the face of a world of objects primarily significant as material for action and desire—is distinctive and indispensable. And the business of metaphysics is, recognizing this certitude to be fundamental and determinative, to build up systematically and by rigorous logical methods an intellectually coherent account of 'objective' reality which shall be accommodated to, and in the last analysis, expressive of, this characteristic and irrepressible attitude of the conscious subject. Even though Professor Ormond's development of these principles be not entirely clear and convincing, the principles constitute, I think, a sound and fruitful *aperçu*; and though they do not suffice to solve all the problems, or fully determine the method, of metaphysics, they express a consideration which any successful metaphysical system must recognize, and recognize somewhere near the beginning of its reasoning.

PSYCHOLOGICAL LITERATURE.

UNCONSCIOUS CEREBRATION.

Should we Still Retain the Expression 'Unconscious cerebration' to Designate certain Processes Connected with Mental Life?

A. H. PIERCE. Journ. Philos., Psychol. and Scient. Method, 1906, III., 626-630.

A noticeable decline in popularity of explanations in terms of 'unconscious cerebration' is accounted for, by the author, by the widespread use of the 'subconscious,' a term not sufficiently defined and applied to a variety of facts by no means reducible to a single principle. For the interest of those who are unable to accept the doctrine of subconsciousness which makes of it a detached companion of the normal consciousness, an inquiry into the proper application of the term 'unconscious cerebration' is here instituted and the use of the term is finally recommended for a certain class of mental processes.

Professor Jastrow's formulation of 'the subconscious' being accepted as the legitimate extent of this term, it becomes necessary to apply the old term for the purpose of covering the phenomena not included under subconscious processes.

Letting the term 'cerebration' stand for those cerebral processes which directly subserve our present or our future consciousness, Professor Pierce distinguishes the following varieties of it: — All conscious processes are divided into two classes, the fully-conscious, and the semi-conscious cerebration.

The class of fully-conscious cerebration includes, (1) the deliberate processes, with results more or less warmly approved and accepted, and, (2) unsolicited cerebration, wholly non-voluntary, which may have two sorts of results: inconsequent, as dreams, hypnagogic images and many trains of waking fancy (3) and, as the other result, facts entirely coherent and to the point, which, irrespective of their unexpected arrival, may be approved by the consciousness, when scrutinized. Such are spontaneously created poems, apt phrases, unexpected solutions of difficult problems, coherent trains of revery or of delirium, which bring our past experiences again into our mind.

The second class of cerebration, the vaguely conscious, with the marginal consciousness as its accompaniment, includes all phenomena belonging to our subconscious experience.

These two classes cover the field of conscious processes. "Are there any varieties of cerebration other than those enumerated above? Is there any cerebration which, while directly significant for consciousness, is not at the moment paralleled by a concomitant consciousness? If such cerebration exists, it shall have the right to be called unconscious."

Taking the definition of unconscious cerebration to mean, as mentioned at the outset, 'cerebration significant for later consciousness, but unaccompanied by present consciousness,' the author believes that the presupposition of such cerebral activities is necessary for the explanation of some obvious facts of our mental life. Such facts 'testified to with notorious universality, have been appealed to unanimously by the advocates of unconscious cerebration.' Such facts are the spontaneous appearance in our consciousness of words momentarily forgotten, the phenomena known as 'mental incubation,' the strengthening of our mental activities after a period of relaxation, when baffling problems are solved with an unexpected readiness. In the same class may be placed certain unusual cases of automatic writing and similar movements, occurring, seemingly, in a state of entire unconsciousness both of their initiation and of their execution. All such types of fact need the hypothesis of unconscious cerebration for their explanation.

However, this term should not be applied to mere accumulations of cerebral energy due to nutritive processes, but rather to cerebral activities of one kind or another. Of course, fresh and abundant accumulations of cerebral energy are most necessary for the best results along the lines mentioned, but mere anabolic processes as such are not in any way to be regarded as processes of cerebration. "Unconscious cerebration in the true sense is the silent adjusting of the cerebral machinery for the subsequent turning out of conscious product. And whenever we are warranted in believing that such silent adjustments have taken place, there we are justified in appealing to unconscious cerebration."

With this formulation, we may exclude certain phenomena appealed to commonly by the advocates of unconscious cerebration. We shall exclude, in this way, that cerebration which is presumably accompanied by low-grade marginal consciousness; this is probably, and many times certainly, the accompaniment of those automatic activities commonly represented by walking and piano-playing. We shall exclude also whatever may be attributed to unconscious cerebration through uncritical use of the word 'unconscious' in its meaning

of 'involuntary and unintentional.' Through such a mistake the less critical followers of Carpenter have appealed to the phenomena of dreams as furnishing contributory evidence for the reality of unconscious cerebration.

Such cerebration as takes place in our dreams is no more unconscious, in the true meaning, than the cerebration of the waking life. Nor are hallucinatory voices, as Miss Cobbe stated, cases of unconscious cerebration; this kind of cerebration has a quite vivid conscious concomitant.

In a word, the term 'unconscious cerebration' should be given to a definite class of phenomena; when used in its proper meaning, 'it seems to perform a service valuable enough to warrant its reappearance in our scientific literature.'

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The Psychic Treatment of Nervous Disorders. PAUL DUBOIS.

Preface by J. DÉJERINE. Translated by SMITH ELY JELLIFFE and WILLIAM A. WHITE. New York and London, Funk & Wagnalls, 1906. Pp. 466.

Preliminary to the discussion of his method of psychic treatment Dr. Dubois opens fire upon the traditional bias of the medical mind in favor of disorders of an exclusively organic origin, contending that until recently, — and to a far too large extent even to-day — the interest of physicians has been centered solely upon the physical manifestations of disease, while such functional derangements as the psychoses have been evaded as entirely ephemeral or else regarded with scepticism and intolerance.

Dr. Dubois awards the palm to Charcot as having been the first to focus attention upon these psychic disorders and in tracing the history of the treatment of mental diseases in France he recounts the ancient and outstanding feud between the school of Charcot and of Janet at Paris and that of Bernheim at Nancy. At Paris it is held that to be hypnotizable is to be hysterical, but Dubois, who espouses the cause of Bernheim, maintains that man is, in his normal state, eminently suggestible — that rather is suggestibility more pronounced in the normal subject, as the 'autosuggestions of the hysterical and the fixed ideas of the insane' render these patients less tractable to outside suggestion.

Upon the plea of practical utility the author erases the rigid line

of demarcation which arbitrary classification has drawn between the physical manifestations of disease on the one hand and the irreclaimable insanities on the other, and intercalates an intermediate territory to embrace the phenomena of abnormal mentality in which there is an absence of a demonstrable organic lesion to form the basis of a somatic disorder and of a sufficient psychic aberration to constitute a true insanity. In this supplementary class Dubois places the affections which he calls the psychoneuroses, restricting the term to the conditions in which the fundamental factor is 'the influence of mind and of mental representation.'

Eliminating then the true insanities and the neuroses which may be referred to somatic causes, the author's thesis is that 'nervousness is a disease preëminently psychic and psychic disease requires psychic treatment.'

Conformably with this postulate Dr. Dubois places the onus of his therapy upon the education of the reason. To this end he seeks to inculcate in his patient a wholesome philosophy and by establishing him upon a rational basis of thought to secure in him an imperturbable sense of confidence and poise.

The author advocates the hypothesis of concomitance and from it infers the philosophical doctrine of determinism. However his reflections upon this subject, being irrelevant to his topic, need not detain us. Leaving the rugged steeps of determinism, the author regains once more the pleasanter plains of his subject with an interesting discussion of the symptomatology of the neuroses and of the efficacy of psychic agency in the alleviation of these disorders.

Of the symptoms of nervousness there is no epitome, but Dr. Dubois regards the mental stigmata as chiefly four: suggestibility, fatigability, exaggerated sensibility, and emotivity. Of these stigmata perhaps the most characteristic is suggestibility, and it is the one to which above all others, educative influence is preëminently applicable. The author shows how general among healthy persons is this openness to suggestion and how enormously exaggerated is this susceptibility in neurotic conditions, such as hysteria and neurasthenia. To combat this unwholesome suggestibility Dr. Dubois prescribes the intervention of sound reason. "Reason," he says, "is the sieve which stops unhealthy suggestions and allows only those to pass which lead us in the way of truth."

Fatigability is a word the author coins to express the 'tendency to tire' which is the especial characteristic of neurasthenia. Added to the physical fatigue incidental to the wear of our ordinary activities,

there is developed in the impressionable mind of the neurasthenic a conviction of fatigue, which, reacting upon his morbid mentality, greatly exaggerates the original condition. Thus the physical state and its conscious perception reciprocally augmenting one another, conspire to embroil the patient in a maze of perplexity. Here too then the method of psychic treatment by appealing to the reason is obviously applicable. By directly attacking the delusion which is the chief source of the mischief, the axe is applied to the root of the disorder.

Dr. Dubois devotes fully three-fourths of his book to a discussion of his own cases, and while the account is lacking in obvious method of arrangement, it is interestingly and convincingly presented. The importance of moral influence is evident. The real strength of psychotherapy is seen to consist in equipping the patient with a surer command of his resources. It is the application to therapeutics of the view recently expressed by Prof. James, that we are prone to under-rate our energies. The experience of all of us bears testimony, that if, when our strength seems quite exhausted, there is a further demand upon our activities, we muster to the call with hitherto unsuspected powers. It is to this reserve force that Dr. Dubois has recourse in his effort to rehabilitate his patients and to its psychological aspect is due the interest of the Dubois method.

While including in his treatment the rest and isolation introduced by Dr. Weir Mitchell and insisting upon the therapeutic value of these measures, Dr. Dubois regards the Weir Mitchell régime of secondary importance to a thoroughgoing system of psychotherapy.

Education or re-education, as he calls it, is therefore the embassy of Dubois' psychic treatment. Renouncing the perfunctory use of bromides, he substitutes a robust philosophy of life and, throughout, his watchword is self-mastery.

Let us hope that under the impetus of Dr. Dubois' splendid example, it will become the task of physicians to imbue their nervous patients with a wholesome stoicism, by inuring them to the discipline of reason. Thus through a proportionate regard for the moral personality, physicians may restore the mental and moral stability of the unfortunate neuropaths and imbue them with the self-command which is the amulet of the Dubois method of psychic treatment.

Demifous et Demiresponsables. J. GRASSET, M.D. Bibliothèque de philosophie contemporaine. Paris, Felix Alcan. Pp. 277.

In a short introduction the argument and plan of this work are set forth. Dr. Grasset's thesis posits the existence in certain psychopatho-

logical states of a condition of semiresponsibility, as the natural sequence of 'medical' responsibility. The doctrine of medical responsibility rests upon physiological or psychophysiological principles. It is based solely upon the health of the psychic neurones and is entirely independent of the doctrinal significance contained in the religious and philosophical conception of responsibility and free-will. Medical responsibility is therefore something apart from moral responsibility.

Because of the bearing upon crime of responsibility as thus viewed and of the subjective importance of its 'attenuation' in morbid mental states, Dr. Grasset proposes legislative mediation in securing its recognition by the courts, with a view to the mitigation or rather the modification of the penalty imposed upon this type of delinquent. In this connection the author notes with satisfaction the growing tendency among criminologists to take account of this pathological equation and cites the beneficent presage of the phrase "individualization of the penalty" which has become current in the literature of criminology.

The first chapter is devoted to an enumeration of examples of 'demifolie' occurring in literature. This history extends from Eschylus to Ibsen and dwells with special stress upon the important contribution to the chronicles of degeneracy furnished by the Russian school. Professor Grasset ascribes this predilection of Russian writers for depicting heroes of morbid and abnormal character to the boundless material available among that nation. For in Russia, according to Orchansky, 'one sees in the sanatoria only the smallest part of the insane.' This historical account of the subject has an undoubted popular and literary interest, but its scientific value is somewhat questionable.

The second chapter is an attempt to refute the two opposed theories, which deny the existence of the half-mad. According to the first view, there are but two groups of men, the sane and the insane, with a sharp line dividing them.

The author bases his objection to this view—called 'the two-group theory'—upon the complexity of the 'psychic organs' and upon the division between the orders of intellectual centers, the superior and inferior centers occupying different zones in the cerebral cortex. Consequently there may exist 'a lesion of a part of these centers, with a resulting diminution without an annihilation of the reason—an attenuation without suppression of responsibility.'

The second view supposes one grand class embracing all humanity, from the genius to the imbecile, and between these extremes

of mind the series is continuous. This theory rests upon the assumption that 'two terms of a series are identical, when they may be connected one to another by a continuous series of intermediate terms.'

In essaying to refute the theory based upon this proposition the author announces many unimpeachable truths, but, in their application to the argument in point, much remains to make his deductions conclusive.

There follows in Chapter III. an attempt to demonstrate clinically the existence of the half-insane. The chapter is a gruesome catalogue of mental and moral aberrations and contains minutiae which belong more properly to a text-book of psychiatry. They are unessential to the purpose of the present treatise.

The interest of the fourth chapter, like the first, is mainly scenic, the rapidly succeeding pictures presenting the spectacle of the foremost intellectual cranks from Socrates to De Maupassant. The aim of this series of tableaux is to reconcile undoubted talent, intellectual ability and preëminent social worth with a marked psychic taint, a fact too patent to require even this fleeting analysis.

Finally, with the fifth and last chapter we come to the pith of Dr. Grasset's inquiry — what shall be a fitting disposition of those who, because of their abnormal mentality, are not entitled to the freedom of society at large and yet who, because of their complete lucidity during long intervals — these respites often extending over a period of years — are justly exempt from the rigid isolation of the asylums?

Dr. Grasset advocates an amendment to the section of the French penal code, relative to the social protection against the insane, which would take account not only of the menace of these unfortunates to society in general, but of the treatment and assistance which are their due as moral individuals.

The author quotes the views of De Fleury, Tarde and Saleilles in support of his insistence upon the absolute divorce between *medical* and *moral* responsibility.

As for the grounds of the concession he recommends in favor of the half-witted, Professor Grasset makes no attempt to dispose of the objection of determinism, as exemplified in the position of Garofalo and of the Italian school, that if normality and healthy psychic neurones are the sole condition of medical responsibility, are we not all equally exculpated in our misdeeds and all fit subjects for treatment equally with the mad and the half-mad? Would not complete normality preclude the possibility of violating the moral law, virtue and vice being, in this conception, identical? Why discriminate in favor

of the 'demifous' whose unhealthy reactions are no less the necessary response to inevitable and inherent stimuli than are all the reactions throughout organic life?

Professor Grasset's book is interesting and suggestive, but as an argument it is thin and unconvincing and contains much that is extraneous. However, as an intercession for greater lenity toward certain delinquents in view of the palliating conditions of mental and moral deficiency and as a plea for a more logical and just estimate of individual character in the accounting of crime the work marks a tendency the importance of which cannot be overestimated.

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PSYCHOLOGY OF RELIGION.

Réligionshygiene. Dr. BRESLER. Halle, Marhold, 1907. (Zeitschrift für Religionspsychologie, Grenzfragen der Theologie und Medizin. Dr. J. Bresler und Pastor Gustav Vorbrodt. Vol. I., 1. Halle, Marhold, 1907.)

We realize that in the psychology of mental disorders the more complex interests of the patient play a dominant rôle, at least from the point of view of the management and of giving the best opportunities for readjustment. Among them, the religious need is evidently receiving renewed attention. Bresler's pamphlet puts in a plea for a sensible consideration of the issues. He sees especially two aims: 'recognition of natural history by the science of religion and the elimination of quackery in religion.'

He appeals to a coördination of the work of theology and psychiatry without, however, entering specifically enough on any concrete difficulties or concrete remedies.

The aim of the journal is:

1. Psychology of religion, the facts of individual and social psychology, developments and conditions of religious life in both sexes, at various ages, in the different layers of population, under the influence of physical disease, climate, alcoholism, poverty, imprisonment, etc.

2. The anomalies of religious life, both the hypernormal fluctuations and the hypernormal deficiencies and their manifestation in mental disease.

3. The cultivation and teachability of religion and the determination of laws of wholesome religious life ('psychagogics' of practical theology).

The first number shows, I think, the difficulty of such an enter-

prise. On the one hand an article by Vorbrodt on Biblical psychology of religion proves to be in many ways an attempt to translate the difficulties of practical and dogmatic theology into the language of a dogmatic though apparently modern psychology, in the main, it is true, with emphasis on a greater assertion of practical issues. It is largely a struggle against dogmatism and against a prevailing tendency towards pantheism. An article by Bresler on the religious feeling of guilt similarly tries to be an intermediary between modern tendencies and traditional conceptions. Neither of these articles have concerned themselves with investigation of concrete facts. On the other hand an article by Freud on *Zwangshandlungen und Religionsübung* will be of a character that might easily become troubling to those of strictly or essentially religious interests. It is a parallel of some facts of impulsive acts with the foundation of religious rites. The patient with obsessions acts as if under the domination of a feeling of guilt, kept alive by renewed temptations and anxious anticipations connected with the idea of punishment. Its rites are protective measures. Further investigation shows that there is always a displacement of a repressed act of instinct. In religious rites the suppression of certain instinctive tendencies seems to be of fundamental importance. They lead to the selection of symbolic reactions frequently chosen from ordinary life, until finally the symbols become the chief thing.

The writers of the journal draw much inspiration from the, to my mind, much more serious movements towards a psychology of religion made in this country. A sketch on a course of psychology of religion given by Vorbrodt certainly would show how much the attempt is a relatively tentative beginning.

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ÆSTHETICS.

Le mensonge de l'art. FR. PAULHAN. Paris, Alcan, 1907. Pp. 380.

This book is of a sort more common in French than in English or German. While it uses throughout the current psychological vocabulary, it is essentially logical in purpose and scope as well as in treatment. The title may perhaps be best translated by the phrase. *Art as Illusion*, though 'Illusion' here carries a less specific meaning than the German *Selbst-Täuschung*. It is indicative of the general character of the book that Paulhan has also written on *Le mensonge de caractère, le mensonge du monde*, etc. Since he makes the 'illu-

sion of art' equivalent, in its broadest sense, to the construction of an ideal system, and points out that there are similar constructions in the fields of industry, science, morals, and religion, the term *mensonge* seems somewhat over-emphatic and misleading.

The essence of art, psychologically, Paulhan holds to be the substitution of a better systematized, richer, and more harmonious world for an unsatisfactory and inadequate reality. It is this unsatisfactoriness of real life that creates the demand for the ideal world of art, a world which is, however, as unstable as it is attractive. If the systematization is of elements not derived directly from actual life, as in music or conventional design, we have 'extra-human art,' a complete substitute for reality, though of necessity satisfying human needs; if the systematization is of aspects of real life, there found imperfect and discordant, we have 'human' art, becoming realistic art, if treated with rigid scrutiny and exact technique.

The fundamental fact in the psychology of art is the artistic attitude, the contemplation of any fact or group of facts, mental or material, as isolated and organized. The artisan, the scientist, the religious person, the moralist, may all take the artist-attitude toward their respective worlds. In this connection there is a brief but suggestive exposition of the fundamentally artistic character of scientific hypothesis. But, in general, these various other typical attitudes differ from the artistic in that they are taken for the purpose of modifying real life, not of escaping from it.

Beauty and art are not equivalent terms, though the experiences are often intermingled. Beauty has objective standards; art is primarily an attitude. Beauty represents the richest and most fully organized experience. The awareness of it is the crowning point of art, not its origin; and the artistic attitude often exists without attaining to it.

Art, though an abstraction from real life, is not wholly detached from it. It is bound up with it, especially in the industrial arts and the arts of ornamentation and design. Life itself is a system, and may therefore be regarded as a work of art. But social systematization is as yet incomplete and troubled, and is consequently imperfectly artistic.

Art is not a species of play, as has been strikingly maintained of late. Play, rather, is a rudimentary form of art. Why include the greater category in the less?

The artistic attitude does not always embody itself in concrete works of art. There are 'frustrated' art-forms, those found only in

reverie and imagination. These lack coherence but are often richer than actual embodiments. Reverie is the starting point of all art.

Art is originally individualistic, but certain forms, such as music and notably the drama, directly involve social activity; and all art implies a social state, a public. Play and the intercourse of polite society are distinct, if not lofty, forms of social art. But art is social in its results, in its effects on individuals, rather than in its inherent nature. In a sense, however, its organization of psychic elements in the mind of each individual is analogous to the social organization of individuals.

If the ethical ideal be that of a life completely systematized and harmonized, art is fundamentally immoral, since it organizes a lesser system, and sets it off from the whole. It sharpens the opposition between the world it creates and the real world. Herein lies its *mensonge*. Secondly, however, art is moral. Arising as a means of escape from the discordances of life, it sets up its own ideal of harmony, which reacts upon real life, thus inciting to greater efforts to bring life into conformity with the ideal. Art is moral so far as it stimulates new ideas and invigorates for renewed practical activity.

The evolution of art is a popular current phrase, but it will not bear rigid analysis. Art, like invention, works by deviation rather than by evolution.

Ultimately, art is inherently contradictory, just as it arises out of discord and division. Its very effort to achieve greater unity and harmony, its reaction upon real life as an ideal, works toward its own elimination. If real life became thoroughly harmonious, there would be no need of an escape from it into the fictitious world of art. Art is typical of the contradiction and evanescence at the heart of all things.

Paulhan's conception of art as an enclosed psychic world cut off from the rest of experience and therefore partial and illusory, seems a description from the outside, logical point of view rather than from that of the artist's introspection. The experience is indeed enclosed, but it carries within itself no such sense of separation and abstraction. Paulhan uses the term 'reality' uncritically, and opposes it too sharply to the 'illusion' of art. And he does scant justice to the social character of art from the psychological point of view. But the book presents with admirable lucidity a survey of the art experience, and is to the reviewer more suggestive and valuable than Souriau's *L'art rationnelle*, with which it invites comparison.

ELIZABETH KEMPER ADAMS.

Wie rahmen wir unsere Bilder ein? MAX FOTH. *Zeitschrift für Psychologie*, 1906, XLI., 145-163.

The author points out that the frame of a picture is not merely a band of indifferently shaped and colored material which serves to separate the picture from the rest of the visual field. In addition to this negative it serves an important positive purpose. In ordinary life, only a part of the whole scene presented to our eyes is seen distinctly, the peripheral parts are seen more or less vaguely. But in looking at a picture, practically the whole scene is seen, as a rule, by the central portions of the retina. What surrounds this scene must be imagined. To further and not interfere with this imagination should be the most important consideration in selecting a picture frame. The problem has three aspects: color, shape and design. The color of the frame should be such as to suggest the things which are the most probable surroundings of the things represented in the picture. *E. g.*, if the picture represents a water-fall, the color of the frame should be that of rocks, or a pasture, or a forest. The author regards this consideration as of more importance than the abstract relation (harmony) of the color of the frame to the color of the picture, since the picture contains usually many colors, but the frame as a rule only one, which therefore can rarely be made to suit every color within the picture. The result of an experimental investigation was that 80 per cent. of the judgments recorded agreed with this view. The same rule is applied by the author to the design (if any) of the frame, which should also suggest the things to be expected in the surroundings of the scene represented in the picture. The same rule may be applied even to the material. So is to be explained the fact that portraits are frequently enclosed in a velvet frame. The gold frame was justified in earlier times, since paintings were usually placed in churches and palaces. This resulted in the growth of a tradition, the influence of which should be counteracted by discouraging the use of gold frames now, when art has become a matter of every-day life.

MAX MEYER.

UNIVERSITY OF MISSOURI.

COLOR VISION.

Versuche mit Eisenbahn-Signallichtern an Personen mit normalen und abnormen Farbensinn. W. A. NAGEL. *Zeitschrift für Sinnesphysiologie*. Bd. 41, Heft 6. Pp. 455-473.

Discussion of objections to laboratory tests for defects of color vision in railroad officials.

It is often contended that the refusal to take anomalous trichromates into the railroad and marine service is an unnecessary severity, the same being perhaps true even in the case of dichromates. Nagel wishes to show that the tests given are not 'severe' but necessary for public safety. It is urged that those who have been tested in the laboratory and found defective are, nevertheless, able to distinguish without mistake the signals used in the railroad and marine service; and, therefore, the experimental tests should be made with lanterns as they are in use. Nagel insists that, if this be done, the conditions must also be as in actual service. Some of these conditions are: practice person has had in distinguishing railroad signals (in anticipation of test), presence or absence of white lights among signals, distance of signals from observer, relative distance and brightness of signals, length of exposure, number of signals exposed simultaneously, state of atmosphere, cleanliness of colored glasses in front of lights, etc. To take account of all these conditions in experiments on the track, is practically impossible on account of expense and time needed. So the best plan seems to be to imitate nature in the laboratory.

In these experiments the same lights are used as in the railroad service; electric lights qualitatively about the same as the light of the kerosene lamp and colored glasses as used by the Prussian railroads.

Arrangement of experiment. — Three holes 1 cm. in diameter and 12 cm. apart were bored in a door connecting two rooms. In front of each of these holes was (1) a metal disc in which the colored glasses were inserted so that each of the three glasses in turn could be put before each hole, (2) another disc with holes of different sizes so that by revolving this each hole could be given six different sizes from 1 mm. to 6 mm. Between the colored glasses and the source of light pieces of ground glass could be placed to reduce the intensity. Thus the apparatus was so arranged that red, green and white (yellowish light of electric lamps) lights could be exposed in varying intensities and extent of field without changing the quality of the light. Each light could be changed independently and entirely cut off, if wished. The observer sat five meters in front of the holes, through which the light came, in a room otherwise dark.

Nagel shows that the visual angle subtended by his lights is greater than the engineer or ship's officer often has to meet in practice so that the conditions for correct answer are here more favorable than in practice. Observers were told beforehand that only the three colors red, green, and yellowish white would be exposed and they were given all the time they wished.

RESULTS.

Persons with *normal* color-vision never interchanged the colors.

Dichromates. — Professor Nagel (green blind) could not distinguish between green and white at all and made twenty-five wrong to fifteen right judgments. He then tried to *learn* to distinguish lights with the aid of secondary criteria such as amount of yellow in each light and difference in contour. By this means he improved considerably until in the seventeenth experiment he made thirty-seven right and seven wrong judgments. This was his best record. Results with two other dichromates, a green blind and a red blind, gave similar results.

Anomalous Trichromates. — A surprising number of mistakes.

Often observer would change his answer almost immediately after making his judgment. This tendency was not noticed in normal persons or in dichromates. When several lights were exposed together the abnormal color contrast was very great so that out of ninety signals given three at a time, wrong answers were given to thirty-seven. The commonest interchange of colors was green and white.

Nagel concludes that it is thus possible in a very crass manner to prove the unsuitability of such persons for service on train or ship. Further communications are promised.

The paper, as is seen, has a more practical than scientific interest and deserves attention in a country where railway accidents are such a common occurrence as in America.

C. L. VAUGHAN.

PRINCETON UNIVERSITY

DISCUSSION.

MR. DUNLAP'S REVIEW OF THE HARVARD PSYCHOLOGICAL STUDIES.

With masterly keenness for summarizing essentials and with temper varying nicely in accordance with the order of the topics reviewed, Mr. Dunlap has summarily outlined and passed upon with illuminating comments the detailed six hundred and forty-four page report of about three years' work of the Harvard Psychological Laboratory force.¹ Ten pages suffice for his admirable resumé and personal commendation or disapproval. Mr. Witmer has already in the initial issue of his Psychological Clinic characterized the Harvard type of psychology as a 'psychology dominated by philosophical ideas.' Mr. Dunlap

¹ Cf. PSYCHOLOGICAL BULLETIN, October 15, 1907.

mentions still other characteristics. Four pages he devotes to an attempt at an impersonal review of the fifty-two pages of optical studies. The one hundred and sixty-three pages concerned with the psychology of feeling he disposes of in a two-page account, containing mainly certain surmises on his own account as to the purposes of the experiments, kindly intimating how they could have been better done, or how they are of no value. The following two hundred and seventy-two pages of the volume, containing reports of extended investigations relating to association, apperception, attention, and motor impulse, demand four pages more from Mr. Dunlap's pen. The last hundred pages of the report evidently pleases Mr. Dunlap as to style of presentation. One of them can even 'be safely recommended as of interest to the general reader.' This remark reviews for our author the last one hundred pages and he is quit of the volume.

Though a subject in a good number of the experiments under discussion and though, as at Mr. Witmer's above noted characterization, amiably surprised at certain of Mr. Dunlap's comments upon these studies, I feel in no sense an inclination to presume to take issue with the reviewer on any general points of difference he may have suggested.

One experiment however I did attempt to conduct myself, and there are points in the review or denunciation of this particular study which I should greatly like to have further developed for the sake of clarity. I shall quote the reviewer in full.

"Johnston's article is in many respects the complement to Keith's. The experimental results presented are merely a mass of introspection from twelve subjects, either on viewing Perry Pictures, or experiencing combinations of odors, tones, noises, touches, and space forms, a member from each of two of these groups being used in each combination. The deliverances of the subjects in attempting to tell the way things felt to them are an interesting study in elevated metaphor. Apparently neither subjects nor author spared words. The main problem seems to have been to find if two feeling tones could be present at once and if the general conditions of complex feeling tones agree with the Münsterberg Action-Theory, on both of which questions the author concludes affirmatively."

I gather from this that Mr. Dunlap, in the expression 'merely a mass of introspection from twelve subjects,' deprecates the resort to the subject's own account of the state of mind which the experimenter seeks under defined conditions to examine. The 'elevated metaphors' also have evidently distracted his attention so entirely that he misses the point of the investigation altogether, to say nothing of the spirit in

which both experimenter and observers sought to approach this delicate problem of finding some nomenclature for these affective states, which undoubtedly they experienced and which are as surely data hence for psychology. It is unfortunate for Mr. Dunlap's sake likewise that we failed to hit upon some scheme, an evident desideratum for the reviewer, for communicating intelligible accounts of these affective states whereby any of us could entirely 'spare words.'

But further, Mr. Dunlap misses something in this experiment which should qualify it as a legitimate psychological inquiry. One of the speakers at the Cambridge meeting of the American Psychological Association two years ago seriously urged that we should cease this hopeless introspection and go vigorously to work, and somewhat indiscriminately, measuring plethysmographically and sphygmographically the complex organic reactions not only of trained psychological subjects, whose account of their experience is unfortunately thought by some to be more or less intelligible, — but measure also the organic changes of the abnormal individuals, the children, and especially the dogs and cats and monkeys and pigeons. From this play of technique, this indefatigable accumulation of records, regardless of the unreliable introspection of conscientious subjects, finally, thought this speaker, a feeling theory, uncontroversible, would eventuate. Mr. Dunlap misses the accustomed pages of photographed records and the neatly presented statistical tables, finds only words, and thereupon throws the experiment out. 'The results are merely a mass of introspection.'

I am still further enlightened however. One of the two 'main problems' seems to have been 'to find if the general conditions of complex feeling tones agree with the Münsterberg-Action-Theory.' The theory in question, I may say, in relation to the outcome of the experiment, was not thought of during the progress of the investigation. The real purpose by which I was led to carry on such a study I have attempted to state fully in an article in the *PSYCHOLOGICAL BULLETIN* of May 15, 1905, and more recently in the *Journal of Philosophy, Psychology, and Scientific Methods*, April 11, 1907. The briefer statement in the necessarily condensed report which Mr. Dunlap has reviewed was, I suppose, obscured for him by the 'elevated metaphors.'

In short, allowing for some natural misunderstanding, particularly in lieu of the 'elevated metaphor' style of the reported investigation, the following points in Mr. Dunlap's review remain to me still so obscure that I venture to ask humbly:

First. How long since and in what way have we, in experimentation with affective aspects of experience, found it inexpedient to rely

upon careful, repeated, and to some extent detailed, introspective reports from subjects? In Lehmann's classic work here is the reviewer certain whether Lehmann or Wundt rightly interpreted the introspection upon which their different theories were based?

Second. In what plethysmographic or sphygmographic study of such states has the introspection been sufficiently reliable as to insure the reader that some definite affective state had a certain characteristic organic change as its physiological parallel? Is it Lehmann, Stevens, Zoneff, and Meumann, Gent, Boggs, Dumas, Brahn, Störing, Binet, Courtier, or Minneman? I shall be glad to review any of these to discover my error in former readings of them, or to look eagerly for any others the reviewer has in mind.

Third. What experiment indicates that its author and his subjects made or could make any distinction between the sensational and the affective constituents of the mental states they seek to measure indirectly by physiological reference, eliminating for example consideration of organic sensations as such, and accounting hence for just the affective elements? Or is such a procedure based upon an inconsistent conceptual foundation? Does the reviewer have in mind the work of Davies?

Fourth. What ground has the reviewer for the assertion that both experimenter and subjects, supposedly bent upon a serious and delicate scientific study, should every week for two years indulge in mere word-play? Or that other subjects in other experiments have more systematically and more continuously attempted or succeeded in so surely introspecting their affective consciousness that no room for doubt was left when experimental tests were begun?

Fifth. Is the Titchener-Wundt controversy, with which I must presume the reviewer to be familiar, a byplay of words? I had mistakenly felt that a real issue was involved. Does not this discussion, as well as the great mass of literature on the psychology of feeling, indicate any possibility that there may be a need for sympathetic coöperation in fixing upon a common nomenclature and thus securing some degree of clearness as to just what states are in question in such investigations? Does it not indicate further too that possibly such states are not describable nor necessarily fully characterizable in terms of respiratory or circulatory changes? Does Mr. Dunlap think the plethysmograph still our chief reliance?

The slight discomfort occasioned by what might seem a somewhat offensive review will be more than counterbalanced if my critic will thus enlighten me to the extent that the tone and suggestiveness of his

criticism indeed indicates that he can. I await with some eagerness such information. Otherwise the meagerness of his personal opinion vouchsafed so briefly may not be sufficiently appreciated.

UNIVERSITY OF MICHIGAN.

CHAS. HUGHES JOHNSTON.

THE METHOD OF EXPRESSION AND THE AFFECTIVE QUALITIES.

In a recent paper, entitled *Sensory Affection and Emotion*,¹ Mrs. Woolley writes as follows:—

“Now in the discussion of these results [the results of the method of expression] carried on between Titchener and his pupils, and the Leipzig school, there has been no question of the fundamental validity of the method. The mutual criticisms have been directed merely against methods of experimentation and of dealing with the curves obtained. But what can be the basis of the assumption that a constant set of physiological processes means an elementary conscious state?”² “For instance, suppose that Wundt establishes his thesis that strain is always accompanied by a given set of changes in pulse and breathing—does that prove that strain is an *elementary* conscious state?”³

Much may be pardoned to one who writes from memory and Phrapatoom. But I should be sorry to have it supposed, by those who have not followed the discussion in question, that I had ever admitted the possibility of determining the elementary affective qualities by appeal to the method of expression. In my first criticism of the Wundtian theory, I said: “Bei dem jetzigen Mangel an Experimenten im Gebiete der Gemüthsvorgänge muss ich mich auf dem Boden der inneren Wahrnehmung und des allgemeinen Raisonnements halten; anderes Terrain hat auch Wundt selber nicht betreten.”⁴ That is, I explicitly ruled out the method of expression as a relevant method. Wundt's reply is largely taken up with an exposition of the results obtained by this method.⁵ That it failed to shake my conviction is sufficiently shown by my adoption of the method of impression in the paper prepared for the Wundt *Festschrift*,⁵ and also by the

¹ THE PSYCHOLOGICAL REVIEW, XIV., 1907, 329 ff.

² *Ibid.*, p. 339.

³ ‘Zur Kritik der Wundtschen Gefühlslehre,’ in *Zts. f. Psychol. u. Physiol. d. Sinnesorgane*, XIX., 1899, 321 ff.

⁴ ‘Bemerkungen z. Theorie d. Gefühle,’ in *Philos. Studien*, XV., 1900, 149 ff.

⁵ ‘Ein Versuch die Methode der paarweisen Vergleichung auf die verschiedenen Gefühlsrichtungen anzuwenden,’ in *Philos. Studien*, XX., 1902, 382 ff. Here I try to convict Wundt out of his own mouth, by quoting the passage: “Die Ausdrucksmethode kann immer nur Ergebnisse liefern, die die physiologi-

direct statements in my St. Louis address.¹ Here I say: "I cannot believe that the method of expression will help us very greatly towards an affective psychology. The organic reactions which the expressive method registers are closely interwoven and interdependent, and the task of differentiation presents difficulties which, if not insurmountable, have at least not yet been surmounted. I am disposed to think, *e. g.*, that the plethysmograph, as a differential instrument, is doomed to disappear from our laboratories. The sphygmograph, and especially the pneumograph hold out better hope; but I doubt if, at the best, a differentiation of affective qualities is to be expected from them."²

Here, surely, there is 'question of the fundamental validity of the method'! In her assertion that criticism has been confined to experimental technique and the interpretation of curves, Mrs. Woolley is probably thinking of the paper by H. C. Stevens, on the plethysmographic evidence for the tridimensional theory of feeling. In this, it is true, the writer expressly disclaims any intention of dealing with affective theory: 'the more immediate end of this essay . . . is to test the validity of the interpretation placed by Wundt upon certain of Lehmann's curves;' 'our own attempt has been to show the invalidity of Wundt's interpretations of certain of Lehmann's curves, selected by him on the basis of his own *differentia*.'³ On the other hand, the same author's Plethysmographic Study of Attention concludes that "(1) changes in rates of pulse and respiration are brought about by the psychophysical process of sensation; (2) every sensory stimulus (probably in proportion to its intensity) tends to produce a fall in volume; (3) inhibited respiration is a characteristic of active attention," and offers these observations in explanation of the 'failure of the method of expression in the domain of feelings'⁴

E. B. TITCHENER.

schen Begleiterscheinungen der Gefühle, nicht aber deren psychologische Natur aufzuklären im stande ist" (p. 383). The same method of impression has recently been employed in my laboratory by S. P. Hayes: see *Amer. Journ. Psychol.*, XVII., 1906, 358 ff.

¹ 'The Problems of Experimental Psychology,' in *Amer. Journ. Psychol.*, XVI., 1905, 208 ff.

² *Ibid.*, pp. 213 f.

³ *Amer. Journ. Psychol.*, XIV., 1903, 15, 20.

⁴ *Amer. Journ. Psychol.*, XVI., 1905, 478; also 410 f., 470 f.

BOOKS RECEIVED FROM OCTOBER 5 TO NOVEMBER 5, 1907.

- Musique et Inconscience: Introduction à la Psychologie de l'Inconscient.* A. BAZAELLOS. Paris, Alcan, 1908 (for 1907). Pp. vi + 320. 5 fr.
- Die Reproduktion und Assoziation von Vorstellungen.* A. WRESCHNER. Ergänzungsband 3, H. 1 to the *Zeits. für Psychol.* Leipzig, Barth, 1907. Pp. vi + 328. M. 10.
- La psychologie de la force.* A. BRASSEUR. Paris, Alcan, 1907. Pp. 235. 3 fr. 50.
- Pessimisme, féminisme, moralisme.* C. BOS. Paris, Alcan, 1907. Pp. vi + 173. 2 fr. 50.
- The Dancing Mouse, a Study in Animal Behavior.* R. M. YERKES. New York, Macmillan, 1907. Pp. xxi + 290. \$1.25.
- L'Année Biologique* (1904). Y. DELAGE. Paris, Le Soudier, 1907. Pp. xxx + 574. [The ninth issue of this excellent annual résumé. It is a pity it is three years behind the year with which it deals.]
- Source Book in Ancient Philosophy.* C. M. BAKEWELL. New York, Scribners, 1907. Pp. xii + 393. ["I have simply brought together the most significant passages (in English) from the earlier philosophers from Thales to Plotinus" (the Preface).]
- Modes of Statement of Cause of Death and Duration of Illness upon Certificates of Death.* Bureau of the (United States) Census. [No date; Washington, D. C.] Pp. 81.
- A Theory of Motives, Ideals and Values in Education.* W. E. CHANCELLOR. Boston & New York, Houghton, Mifflin & Co., 1907. Pp. xiii + 534.

NOTES AND NEWS.

THE sixteenth annual meeting of the American Psychological Association will be held, in conjunction with meetings of the American Association for the Advancement of Science, the Society of Naturalists, and many affiliated societies, at the University of Chicago. The sessions will probably be held on Tuesday, Wednesday and Thursday, December 31, and January 1 and 2. By vote of the Council, all titles for papers to be read at the meeting are required to be in the hands of the Committee of Arrangements not later than December 15.

The project of a *Dictionary of Sociology*, presumably in the French language, is announced to be undertaken with the aid of the

Institut Solvay, of Brussels, by Dr. W. Heyman. The 'Dictionary' is to be modelled after Palgrave's *Dictionary of Economics* and Baldwin's *Dictionary of Philosophy*.

WE REGRET to announce the death of Mr. N. Vaschide, assistant director of the Psychological Laboratory of the École des Hautes Études, Paris, author of several well-known publications, and formerly collaborator on the *Psychological Index*.

MR. F. N. FREEMAN, assistant in the Yale Psychological Laboratory, is to substitute for Professor Gault in psychology and education during the fall term at Washington College, Chestertown, Md.

MR. H. KAKISE, late assistant to Professor Y. Motora in the University of Tokyo, has become assistant in the Psychological Laboratory at Clark University.

DR. ELSIE MURRAY, late fellow in psychology at Cornell University, has been appointed assistant in the Psychological Laboratory at Vassar College.

DR. MABEL CLARE WILLIAMS has been appointed instructor in psychology in the State University of Iowa.

MISS S. V. ROSS, A.B., '06, has been appointed reader in psychology at the University of California.

ON October 7 Professor Jaques Loeb read a paper before the Kosmos Club of the University of California entitled: 'The development of instincts out of reflexes and of thinking out of instinct.' The writer stated that his bio-chemical investigations had forced him to the firm conviction that the whole situation would finally be explained in terms of physical chemistry.

THE following are taken from the press:

PROFESSOR GEORGE S. FULLERTON, of Columbia University, has been given leave of absence and is spending the present year at Munich. His courses are given by Professor Arthur O. Lovejoy, of Washington University.

PROFESSOR JOSIAH ROYCE is this year giving courses on ethics and metaphysics at Yale University on the Harvard lectureship foundation. Professor Royce also gives a course of six Lowell lectures on the 'Philosophy of Loyalty,' beginning on November 18.

DURING the first half of the present academic year Professor F. J. E. Woodbridge, of Columbia University, will continue to lecture on philosophy at Amherst College on Saturdays.

PROFESSOR THEODORE DE LEO DE LAGUNA, of the University of Michigan, has been called to Bryn Mawr College as successor to the late Professor David Irons.

THE
PSYCHOLOGICAL BULLETIN

ON THE PSYCHOLOGY OF THE FAMILY.¹

BY PROFESSOR JAMES H. TUFTS,
University of Chicago.

Two elements of strain in the family life of the present seem worthy of psychological analysis. Both arise in a considerable degree from the fact that whereas man's work has tended to become increasingly scientific and professional the work of the woman in the family has tended to become more exclusively personal. Ellis and Thomas have dwelt sufficiently upon the fact that man's work in society is essentially the organization of the various industrial processes which formerly either belonged to woman or at least were conducted in the household, and were therefore shared to a greater or less degree by both men and women. The removal of these various industries from the house has been accompanied by the application of scientific methods to their organization. It has at the same time left as the activity of woman the management of the house and the personal relations to the members of the household. Of these two spheres of woman's activity the first has as yet failed to receive any considerable degree of advantage from the progress of science and industry. The second is necessarily incapable of scientific or professional organization. It is the purpose of this note to point out two psychological aspects of the situation.

The first consequence is that whereas man has gained in greater and greater degree a scientific and objective standard for his work woman neither has nor can have—at least in the sphere of personal relations—the advantage of a standard. For the educated woman who is balancing a career against a family life, or for a woman who appreciates the general culture of the time and its scientific progress

¹ Rewritten from a passage in *Ethics* by John Dewey and James H. Tufts (in press).

this difference constitutes a serious factor. A man's satisfaction, and indeed as James has shown, his total measure of himself, depend largely on his success. Not necessarily success as measured by popular standards, but success in the sense of doing his work well or performing some real function in society. The man can measure his success by objective and scientific standards; the woman must measure her value largely by subjective or personal standards. Business has objective ratings in the quantity of business, the ratio of net profits, the amount of new business, and in various other tests. The professions likewise have their standards; if not so definitely quantitative they are nevertheless to a considerable degree objective. The mechanic builds his wall and it either stands or falls. The engineer constructs his bridge, the lawyer wins his case, the physician helps a certain proportion of his clients and can check this up by the records of other physicians. The teacher and the preacher depend more upon personal standards, but they have at least this advantage in common with their other professional brethren: they can appeal to their professional colleagues. If they are discouraged or dissatisfied with the judgments of those with whom they are dealing immediately, and from day to day, they have an appeal to what is felt to be a more impartial and a juster estimate. And the value of a standard is not merely that it ministers to self-respect; it has the further and more objective value that it helps raise the individual to the level of his profession. If he must meet a fair test he will be more likely to rise to the demands of the situation.

The woman in the home has no such standard, so far as her personal relations are concerned. The only judges of her success are the members of her immediate family. If they do not give a favorable decision or — what is just as bad — if they do not give any decision, there is no wider circle, no group of expert colleagues by whose support she can fortify herself. If the home is not satisfactory that is the end. The woman does not even have the refuge of the neglected discoverer, or conscientious champion of an unpopular cause. These may comfort themselves by the thought of an appreciation by posterity or by God. But if the woman has failed — or doubts whether she has succeeded — in the personal relations to her immediate group, no other appreciation is important. Like a poet or other artist she must produce an actually valuable result. If the artist's result is not actually valued he may at least believe that it is valuable, for he may think of later appreciation. But the woman inevitably feels that if her work is not valued it is not valuable. If it is not appreciated by this group

with which she is in immediate relation it fails. For there is no objective standard of a successful home any more than there is of a good work of art. It is easy enough to point out reasons why the picture or the home should please and satisfy, but if the work itself is not convincing, no demonstration that similar works have satisfied is of any avail.

And the other disadvantage arising from lack of standard is just as obvious. The woman who needs the support of a test which she recognizes as valid fails to find it. If the family is too lenient she falls below her best; if the family is actually fair she has no objective reasons for conviction, and if disposed to do less than her best she has not the powerful incentive which professional standing affords.

A second psychological feature of the woman's situation is that whereas man deals with persons abstractly, woman in the home deals with persons concretely. In a man's dealings with his fellows he meets them for the most part on a business, or professional, or political, or club basis. He meets a large number of persons, but the abstract way in which he deals with them acts as a fence. He does not have to 'stand' them entire. He can sell a man an article or teach a class, or argue with a fellow attorney, without entering into those intimate relations which involve strain of adjustment in its fullest extent. Moreover, business or professional manner and etiquette come in to relieve the necessity of personal effort. The 'professional manner' serves the same function in dealing with others which habit plays in the individual life; it takes the place of continual readjustment of attention. When a man is forced to lay this aside and deal in any serious situation as 'a human being' he feels a far greater strain. As a physician said to the writer, "The half-hour spent in convincing a patient and his family of the necessity of an operation and in bracing them up for the event, is far more exhausting than the task of operating with all the strain on attention and with all the risks which this latter involves." Practically all man's relations are abstract, and to a considerable degree professionally organized.

The woman of the family meets fewer persons, but she has to take them as wholes. She has to stand them in all their aspects. The teacher sometimes asks the parent, "You think it is hard to care for one child; what would you do if you had to take charge of forty?" The fallacy of the question lies in the assumption that the teacher has all of the child in the school room. It may be thought that the wife does not have to deal with the whole personality of the husband, for he leaves at least his business or his professional self behind when he

goes home; but even this may not be wholly a gain if, as is very likely the case, his business or professional self is the most interesting self that he possesses. The children certainly have to be taken altogether. Even the dealings with servants are largely personal, as is indicated by the fact that they are still called servants rather than employees. The work which they do is in the end to meet a personal test in the comfort, or lack of it, which is produced. And the imperfectly organized condition of the family industry makes the result sufficiently uncertain to reinforce the other factors of personal strain. If any relief in either of the two sources of difficulty in the modern family is to be obtained it is to be looked for apparently through one of two lines: Either a woman must have some vocation aside from her personal relations, and find in this vocation to a considerable degree the objective standards of valuation and the consciousness of doing things in a scientific way, with all which this implies. Or, the family life itself must get some advantage of the scientific movement which shall give an opportunity there for definite consciousness of method, and thus lessen the strain of continuous personal adjustment where the factors are uncertain and without objective control. Perhaps both lines of relief are possible.

VOLUNTARY ORGANIZATIONS, A PROPOSED STUDY IN SOCIAL PSYCHOLOGY.

BY DR. CAROLINE M. HILL.

The psychology of society, like the psychology of religion, has been studied largely in its abnormal manifestations. Manias, crowds, crazes, religious revivals, and economic crises are examples of social feeling and impulse only, and that a primitive kind of social feeling and impulse. These abnormal phenomena have frequently occurred in assemblages of people called together regularly, for intelligent purposes, and in their ordinary meetings showing only normal phenomena. The massacre of St. Bartholomew, colonial witchcraft, and revivals in primitive communities at the present time could scarcely take place if it were not for a constantly exerted religious pressure upon a certain kind of minds. In all these instances the church has been the instrument of social control, the priest or the minister the social psychologist of the period who most thoroughly understood the people with whom he dealt. Political demonstrations occur in crowds called together by some organization, strikes among men who have a common occupation and have worked at it together under abnormal conditions which might be said to constitute them into an involuntary association. Voluntary political associations constitute the organs of government and one of the two most important methods by which public opinion is expressed. Voluntary associations for intelligent reasons and with definite ends constitute the highest form of expression of the social mind — in them is found the completest social self-consciousness.

The existence of the social mind was much discussed about ten years ago, and persons who spoke glibly of the masculine mind and the feminine mind, the Jewish mind and the Greek mind, the metropolitan mind and the rural mind, would deny the possibility of social psychology unless it were proven that there is a social mind. Now we may leave that question in abeyance while we study the corporate activities of minds, just as philosophy has left the question of the existence of a God to be settled by the individual's experience, and psychology has left the question of the existence of the soul to be settled by the activity of consciousness. Social psychology without a

social mind is by no means so radical a step as philosophy without a God or psychology without a soul.

As Baldwin has said, the social organism is psychological and not biological. What Tarde calls the inter-psychology of a period is popularly called public opinion and may be best studied in the United States, where it has the most influence upon government. According to some students of public opinion (see Godkin, *Atlantic Monthly*, Vol. 78, p. 1, 1896, and Jenks, *American Journal of Sociology*, Vol. I., p. 158, 1894), this influence is very small, for economic conditions practically control it; but however farcical government by public opinion may have become, there are yet two ways by which it is expressed, by organizations and by newspapers. Bryce says ('American Commonwealth,' Vol. II., p. 269) that associations are "created, extended and multiplied in the United States more quickly and effectively than in any other country. In nothing does the executive talent of the people show better than in the promptitude with which the idea of organization for a common object is taken up, in the instinctive discipline that makes every one who joins in starting it fall into place, in the practical, business-like turn which the discussions forthwith take." In these associations individual minds function together and a social mind exists while it acts.

A study of organizations in the United States has never been made and the writer proposes to attempt this for some one city along the lines indicated in the following outline. Philosophers have long been accustomed to take all knowledge for their province and the magnitude of the undertaking will not be so appalling to them as to those who have some knowledge of associations. The study will be begun by an investigation of organizations in a town of 20,000 inhabitants, followed by a study of the organizations to which 100 members of the Chicago Woman's Club belong, and those to which their husbands belong. Organizations according to nationality will be studied first in the social grouping among negroes—the most primitive in their instincts of any foreign nationality in America. Ultimately a study of voluntary organizations might include:

I. Organizations according to sex.

1. Among primitive peoples.

Do men only have the social impulse as Schurtz says in 'Alters-klassen und Männer-bünde'?

2. Among boys and girls.

3. Among adolescents.

High school and college fraternities and sororities.

Initiation ceremonies and primitive practices.

Characteristic literature.

Political methods.

4. Among men and women.

a. The woman's club movement in the United States.

1. Church and charitable associations.

2. The W. C. T. U. the first national movement among women.

3. Educational clubs.

Progress from self-culture to social coöperation.

4. Meaning of the effort to obtain citizenship.

b. Men's clubs and their activities.

Typical political clubs.

Typical social clubs.

5. Clubs which include both men and women.

II. Organizations according to nationality.

Kinds of organizations among negroes, and among Irish, Poles, Hungarians, Germans, Scandinavians, Bohemians, Italians, Greeks and Jews in Chicago.

Attempts of each nationality to adapt itself to democratic institutions.

III. Religious organizations.

1. Among primitive peoples.

2. The early Christian associations.

3. The organization of the Catholic Church — the methods by which it obtains and keeps social control over certain classes.

4. The protestant church and individual initiative.

5. The division of the protestant church along national lines.

6. Modern forms of religious organization which attempt to meet the needs of different classes and temperaments;
e. g., Socialism and Christian Science contrasted.

IV. Political organizations.

1. Organizations typical of different periods of history.

Secret — Carbonari, Tugendbund, Nihilists.

Non-secret — Jacobin Club.

2. Organizations at different periods of United States history.

The colonial town meeting.

Revolutionary clubs.

Campaign clubs in 1828, 1840, 1860, 1884, 1896.

3. Political organizations at the present time compared with

previous ones as to membership, attendance, dues. Influence of economic condition of the country. Compare the motives which hold together these organizations with those that hold together church and fraternal organizations.

4. Reasons for decline of interest in American politics.

Passing of frontier conditions.

Passing of emotionalism.

Universality of education.

5. The revival of interest in the last five years.

V. Fraternal organizations.

These seem to be the original soil from which all other forms come, but enough information to form a basis of comparison is difficult to get. A classification of such organizations in one city, with statistics of membership, and general purposes stated, may be of some value.

Criticisms of this theory and plan or further suggestions are invited and may be addressed to the writer at 5728 Madison Avenue, Chicago.

PSYCHOLOGICAL LITERATURE.

SOCIAL EVOLUTION.

L'Évolution créatrice. HENRI BERGSON. Paris, Alcan, 1907. Pp. 400.

M. Bergson studies the development of the eye as it appears in the invertebrate, and in a member of the family of the molluscs. Though the embryological origins of the different portions of the organs are entirely different, though the conditions under which the evolution takes place are quite as diverse, still we find essentially homologous organs, with like mechanism and correspondent parts.

Neither the explanation of the Darwinians who appeal to chance variations chosen by natural selection, nor the operation of the external cause of light itself, nor the inheritance of acquired characteristics which have arisen out of the effects of the form itself, can satisfactorily account for the appearance of so complex an organism in so divergent forms under so diverse conditions.

The purely mechanical explanation and that of radical finalism, of teleology, cannot be depended upon in the presence of these problems. "The vigorous application of the principle of finality as that of the principle of mechanical causality leads to the conclusion that 'all is given.' The two principles say the same thing in their different tongues, because they answer to the same need" (p. 49). But it is just this assumption that all is given, which the author refuses to accept. Neither is the eye, as an eye, given as the result of mechanical causes nor as an idea, an end. The fact that it arises under such diverse conditions from such diverse elements makes its appearance a creation — a new form, — which cannot be mechanically accounted for — considered mechanically the eye is all there in the elements out of which it arises. As an event it is something more than these elements which they therefore cannot explain. But the idea or plan of the eye could only explain it by the use of the mechanical means which achieve the end in view, and in the world of mechanical means implied, the eye before its appearance does not exist. The idea of it cannot be present until the eye itself has arisen. The idea of the eye presupposes vision. Each method demands an explanation in terms of reflection, which moves in a given world, where rearrangements may take place, but nothing essentially novel can possibly appear. Mechanics cannot

state even the new form that arises. Teleology, if it is radical, must assume the form already in existence.

In the work, however, of the Neo-Darwinians and the Neo-Lamarckians M. Bergson recognizes two points of view which supplement each other and suggest his own doctrine of the 'vital impulse' (*l'élan vital*). The dependence of evolution upon variations arising out of elements in the geminal cells can be regarded as most probable, especially when one assumes with de Vries that these variations tend to appear in successive periods. On the other hand the influence of a force within the organism pushing on and in some sense directing its development, such as the Neo-Lamarckians find in the psychical element in evolution, is rendered quite unavoidable when one faces the appearance of such corresponding structures as the vertebrate and molluscan eye. Psychical, however, in the sense of our own effort, or even in that of conceivably conscious animals, this influence cannot be, for the field of its operation would then be too confined. What is implied in evolution is an impulse with a direction indicated in the homologous functions and organs of living forms, an impulse which is instinctively conscious in animal life, and intelligently conscious in man. An impulse which is identified with life on the one hand and consciousness on the other (pp. 92 ff.).

All who have taken a philosophic interest in the theories of evolution will recognize the pertinence of M. Bergson's considerations. The result of nearly three quarters of a century's observation and speculation has been to leave all who are acquainted with the problem, the hypotheses, and the conditions of their acceptance, evolutionists. We all believe that species have arisen. On the other hand, the doctrines of evolution have been specialized to meet particular phases and types of developmental problems. When one rises above these specific problems, he feels one general defect which has been but imperfectly met where it has been appreciated, *e. g.*, by the orthogenesisists. This defect is that the uniformity of what we may call onward movement, along diverging paths, in diverse organisms, the common direction which becomes evident amid a thousand conflicting directions in growth, gets no scientific formulation nor explanation. Mechanically there is no meaning in a direction. There exist simply readjustments, and Spencer's criteria of increasing heterogeneity and complexity are a *petitio principii*, for complete physical and chemical analysis would show these characteristics to be entirely due to the false perspective of human cognition. In a word—to use M. Bergson's expression—where everything is conceivably reversible nothing can assume a new

form. The forms are purely phenomenal devices for convenience in stating things. And in a completely mechanical world every series is conceivably reversible.

The teleologist on the other hand has proved himself as helpless in meeting the problem as the mechanical biologist. Mechanically we can explain various specific evolutions, we cannot explain evolution. Teleologically we find that consciousness has too narrow a field to be called upon to account for general direction, for onward movement; and when we leave the field of conscious effort, teleology becomes a misnomer or a mere restatement of the problem of evolution.

When, therefore, we read in *l'Évolution Créatrice* that development is to be accounted for by a cosmic vital impulse we feel at first that a name is to be pushed forward to cover up an inexplicable or unexplained situation. A vital force — for the author parts company early in his work with the vitalists — is not a scientific conception. It is frankly metaphysical. The author insists (pp. 212) that the problem is essentially philosophic rather than scientific, though he suggests the possibility that a later science may succeed in using the philosophic point of view to translate the phenomena of physico-chemistry as Descartes used algebra to translate geometry.

The grounds for the assumption of a metaphysical technique to transcend the scientific, have been in part suggested. No purely mechanical nor radically teleological doctrine can logically admit of the appearance of new forms. For these points of view, everything is given in advance. The use of teleology within the field of conscious endeavor does not reach the process which transcends these comparatively late forms. But those who are familiar with the author's earlier works,¹ will recognize doctrines which prepare the ground for this injection of metaphysical concepts into a seemingly scientific problem. M. Bergson's conception of time,² or duration — is sharply opposed to the Kantian treatment. This treatment placed time and space upon a common level. They were both forms of the sensibility; one of the outer and one of the inner sense. For Bergson, time in its purest form is the very stuff of our inner experience, which in this pure form is essentially the absolute or in the absolute, while geometric space is the product of the understanding whose function is that of fixing change and the conditions of conduct in the abstract forms which have their purest expression in geometry. In geometry and the scientific

¹ *Essai sur les données immédiates de la conscience*, Paris, 1901. *Matière et Mémoire*, Paris, 1900.

² *Données*, Chap. II.

world which is geometrized, there is no real duration; on the contrary we find there only reversible series which may symbolize that which arises in consciousness but can never be that change. The further characteristic of this duration is that its phases are in the nature of the case irreversible and unreducible. Now what is irreversible and unreducible¹ is a creation — it is absolutely new. It cannot be anticipated, for this assumes its position in a reversible series which we construct out of a past whose elements are capable of reduction and reconstruction. The nature of conscious life as it appears unintellectualized is that of creation, for out of its flux arises the constantly new form. The anticipation of the future such as the prediction of an eclipse deals only with a scientific time which resolves itself on analysis into a series of correspondences — a series of *t*'s — which represent the relations of intervals not the intervals themselves. The intervals themselves must be experienced. This prediction bears therefore only upon a present and resolves itself into a statement that conditions being such the conditioned will be such.

Not only is this duration which is the stuff of subjective experience essentially creative, it is that in which direction appears — a direction, that is, that does not belong to reversible series but is absolute. All other directions are purely relative to the demands of human conduct and appear in a spatialized world whose series are all reversible and subject to reconstruction. In the consciousness of duration we find alone that absolute impulsion which being by its own nature creative at once meets the demand of an evolution. If then we can identify this vital impulse with this absolute phase of consciousness, we shall have at least more than a term to cover up an unsolved problem.

Further analysis of this conception of consciousness and the spatialized world which stands over against it, brings to light further important distinctions.

M. Bergson's doctrine of perception² finds in this function a capacity only for 'canalizing' the conditions of conduct so that one may grasp what will be in the line of a possible act. The physical world is presented in the form of conditions of conduct in which the end of the act and the necessary steps to that end are embodied. Thus the perceived world and the conceived world of science which is derived from it cannot deal with motion while it is in progress. In so far as the world is spatialized, the actual course of immediate duration is lost. Not only is this the case; the two proc-

¹ *Évolution créatrice*, 29 ff.

² *Matière et Mémoire*, chaps. I. et IV. ; *l'Évolution*, p. 206.

esses, that of immediate consciousness and that of mediate, reflective consciousness, are opposed to each other; the spatialized scientific world presenting the conditions of conduct and the obstacles to conduct. The free act in its immediacy opposes itself to these fixed conditions and overcomes the obstacles. It opposes itself to the fixed conditions, but it makes use of them and the obstacles become means. There appear two movements in opposed direction in our world so far as we freely act. We are introducing freedom into a determined environment, and that by means of the environment.

This is just the nature of evolution as M. Bergson conceives it. In a world in which physical forces seem to be running down—transforming themselves into heat which dissipates—life arises, moving in a contrary direction. It stores up energy (p. 267) where the physical mechanism is running down. If we think of the physical universe as falling, life stops that fall to a certain extent, storing up the force it uses it for its own ends—to serve its own vital impulse. But if the physical world resists thus the vital impulse, it gives it its conditions of expression and its very obstacles become means.

The analysis goes still further. The world as spatialized is the necessary inversion of the world creative, alive. The physical universe is reduced by physical science—spatialized or geometrized—to a whole within which different isolable systems arise—like our solar system—but they can have reality only as they are parts of the whole within which are no real forms or objects, only the whole. It remains for life to produce forms which are real, and these two are corresponding processes. The more the world of the physical science is disemboweled the more the forms are recognized as arising in creative evolution. In a word M. Bergson finds in the logical distinction between the objectified world of means, and the inner world of voluntary reconstruction the basis for a metaphysical distinction between the inorganic and the organic, between the dead and the living, between the world of physics and chemistry and the vital impulse which is responsible for all forms of plants and animals. “The impulse of life, of which we speak, consists in a word, in an exigence of creation. It is not able to create absolutely, because it encounters before it matter, that is to say the movement inverse to its own. But it takes possession of this matter, which is necessity itself, and tends to introduce into it the greatest sum possible of indeterminism and liberty” (p. 273).

It is impossible to do more than indicate the point of view of this very extraordinary work, with its clear analysis of voluntary theory, and its subtle but never obscure metaphysical and logical speculation.

In closing the reviewer can only express his surprise that M. Bergson has not recognized the creative power of consciousness in the construction of the very scientific world and its matter which for him stands opposed to thought and life. It seems to be only in the unconscious creations of perception and the unreflective phases of voluntary processes that he can perceive the creative fiat which is identical in consciousness and nature.

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GENERAL SOCIAL PSYCHOLOGY.

Folkways. A study of the sociological importance of usages, manners, customs and morals. WILLIAM GRAHAM SUMNER. Boston, Ginn & Co., 1907. Pp. v + 692.

Professor Sumner's former students will not need the implication in the preface that this book is built out of material gradually accumulated during years of instruction. The range of illustration, the crisp, clear English, the vigorous dicta on policies and current conceptions, bring back vividly the memories of what has been to many a stimulating and fruitful experience. Other readers will find the class-room genesis of the book equally apparent. The great accumulation of material, of which the present volume presents but a part, has evidently grown in the work of instruction. To some extent, at least, it might be easily organized under other titles. The book is far fuller and richer than a work *aus einem Guss*, but it is also less sure in the ordering and arrangement of its material.

The central purpose of the author is to state and illustrate his views as to *Folkways* and *Mores*. Although the former is taken for the title the focus of interest is almost entirely in the latter. "The folkways are habits of the individual and customs of the society which arise from efforts to satisfy needs." The struggle to maintain existence was carried on individually but in groups. Each profited by the other's experience; hence there was concurrence toward that which proved to be most expedient. All at last adopted the same way for the same purpose; hence the ways turned into customs and became mass phenomena. "The young learn them by tradition, imitation and authority." Although the above would suggest a rather definitely utilitarian, and in this sense rational origin for folkways, it is insisted that the habits arise from recurrent needs and are not themselves foreseen or intended. "They are not noticed until they have long existed, and it is still longer before they are appreciated." Moreover, a further

factor which the author calls 'irrational,' enters into the formation of folkways, namely, the aleatory interest, the element of good and bad luck. "One might use the best known means with the greatest care, yet fail of the result. On the other hand, one might get a great result with no effort at all. One might also incur a calamity without any fault of his own." All such good and bad luck was attributed to superior powers, hence "the aleatory element has always been the connecting link between the struggle for existence and religion." It was only by religious rites that the aleatory element in the struggle for existence could be controlled." [In view of this last statement and of various others like it, it is evident that Professor Sumner uses 'irrational' in the sense of 'mistaken,' rather than in the sense of 'not adapting means to ends.' If a savage believes that sympathetic magic will give him a good crop it is just as rational a process for him as a large part of human activities. To the next generation present methods of treating many diseases, or of guarding against commercial panics, or of educating children, may appear to be as far wide of the mark as the savage interpretation. So, when it is said 'The nexus between them (ghosts, demons, another world) and events was not cause and effect but magic,' it is obvious that the author must mean, 'Cause and effect as viewed by modern science.' For the savage believes profoundly that he is working for the cause of his good or ill luck when he looks to the other world, and seeks to control his welfare by the chain of what is to his mind cause and effect.] Another 'irrational' element in the folkways is due to accident or a mistaking of the *post hoc* for a *propter hoc*. Some customs formed in this way and also some formed by inference from the supposed will of the gods may be decidedly harmful.

The *Mores* are the folkways raised to another plane. "The mores are the folkways including the philosophical and ethical generalizations as to societal welfare which are suggested by them, and inherent in them as they grow." The two elements out of which the conception of welfare is formed are 'right' and 'true.' The exact psychological root of 'right' is somewhat variously stated. The problem has evidently got its formulation in opposition to intuitionism, and without reference to the questions which now most interest the social psychologist. It is insisted that "the notion of right is in the folkways. It is not outside of them, of independent origin, and brought to them to test them." So far, it is easy to follow. But the precise element—or elements—in the folkways that gives rise to the idea of 'right' is not so readily located. The following leaves it uncertain whether the

stress is to be placed on the habitual factor or on the ancestral source. "The right way is the way the ancestors used which has been handed down. The tradition is its own warrant." The next citation seems to make the ancestral the ultimate source; "In the folkways, whatever is, is right. This is because they are traditional and therefore contain in themselves the authority of the ancestral ghosts." The question then arises, What is meant by 'authority of the ancestral ghosts'? Certain passages seem to use the term as equivalent to 'ghost fear.' "Thus (p. 28 f.) it may well be believed that notions of right and duty and of social welfare were first developed in connection with ghost fear and other worldliness, and therefore that in that field also, folkways were first raised to mores." So in the preface: "They (the folkways) are intertwined with goblinism and demonism and primitive notions of luck, and, so they win traditional authority." On the other hand we read that "the ways of the older and more experienced members of a society deserve great authority in any primitive group" and this is spoken of as a 'rational authority' (p. 11). Again, four elements are enumerated (p. 30), as 'ghost fear, ancestral authority, taboos, and habit.' The authority in the reference is apparently rational chiefly in the sense that it is more skilful in the use of means to ends. The question as to whether authority is also based in part upon a will or purpose directed toward the good of the group is not raised. The author's categories for explanation are on the whole frankly individualistic, although sentiments of 'loyalty to the group, sacrifice for it' are recognized—phrases which certainly imply the 'metaphysics,' of *Völkerpsychologie*.

By the other element involved in the mores, namely, that they are 'true' is meant that they fit into a consistent view of the world and its powers natural or supernatural, and therefore give to the particular the value of a place in a system, a world philosophy. Thus the folkways take on larger meaning and value. They are also reinforced by reflection on pleasures and pains that follow according as they succeed well or ill. The notion of welfare was a resultant from the mystic and the utilitarian generalizations combined. When this has been formed the folkways become mores. The valuable in this is chiefly its emphasis upon the fact that in customs or mores we have not only habits but also judgments of value. So far he agrees with Hobhouse (*Morals in Evolution*, p. 13 ff.). But whereas Hobhouse starts the approval or disapproval largely in some sympathy or antipathy, although speaking also of 'impulses social and selfish,' Professor Sumner relies on, (1) a more definitely rational or utilitarian con-

ception, (2) a mystic sanction of ghost fear, (3) possibly also a conception of 'authority' in ancestors, and (4) connection with a world-system. There seems little doubt to the reviewer that the element stressed by Hobhouse enters in; it finds expression in all the various organs of group opinion. Further, it seems evident that the conception of authority implies a conception of social unity, which may be backed by fear but is never to be derived from it.

An ethical philosopher, jealous for his profession, might find ground for criticism in the apparently conflicting doctrines as to the relation of reflective thought or ethical criticism to the mores. On the one hand, philosophy and ethics seem to be regarded as invariably noxious; on the other, the author not only criticizes unhesitatingly and unsparingly the present mores, using for the purpose standards and principles which are certainly ethical and philosophical, but he provides also for a legitimate function of such critical reflection. On the one hand, he writes that philosophy and ethics "often interfere in the second stage of the sequence — act, thought, act. Then they produce harm." So, too, 'great principles' are usually referred to in quotation marks and with the imputation that they are neither great nor worthy to be followed as principles. On the other hand, it is said, that 'free and rational criticism of traditional mores is essential to societal welfare.' The solution for such contradictory statements is doubtless found in the author's conviction that most philosophy and ethics have been formed in an abstract and speculative fashion, without regard to the guiding principle of social welfare. Nevertheless a large number of the author's own keen sarcasms and judgments are not reasoned; they doubtless rest on general principles of the author's and are presented in as categorical form as any of the theories which he considers as 'ethics' and 'philosophy.'

But it is ungracious to dwell upon matters of this sort. Every student of social psychology, morality, and the history of civilization will be grateful to Professor Sumner for the wealth of material which is here presented. The illustrative material is grouped under such headings as Labor, Wealth, Slavery, Cannibalism, Sex, Marriage, Codes of Manners, Primitive Justice, Uncleanliness, Sacral Harlotry, Child Sacrifice, Sports, Drama, Asceticism. It has been gathered from a great range of authors, and although the student misses the names of some important workers in the field, he will be grateful that many sources have been laid under contribution which are not usually drawn upon in similar works. The author's earlier studies in the field of economic history have doubtless served a purpose here, and the *obiter*

dicta on various sentiments and conceptions current in the political, educational, social and religious field, enliven the pages. Such themes as 'Missions,' 'Democracy,' 'The People,' 'Pensions,' call out vigorous expressions. Every reader will hope that the author will soon be able to carry out the further plan announced in the preface of publishing another volume or volumes of similar material upon other topics.

J. H. T.

La Physionomie Humaine, son mécanisme et son rôle social. DR.

I. WAYNBAUM. Paris, Alcan, 1907. Pp. 320.

The first part of this book, comprising one hundred pages, is devoted to the statement of a vascular theory of the facial expression of emotion. The face must be considered as part of a whole organism, and as intimately connected with the brain. The intra-cranial and the extra-cranial blood supply form a closely related system, the common carotid dividing into the internal and external carotids, etc. Every emotional state modifies to some degree the cerebral circulation. But it is important to keep this intra-cranial circulation as uniform as possible, and the blood-vessels of the face and scalp act as safety-valve and reservoir for the cerebral blood supply. In blushing the face relieves the brain of what would be too great a supply. Every facial movement produces some change also in the external circulation and this reacts upon the intra-cranial circulation. The muscular contractions of the face are to some extent under voluntary control and hence have been greatly modified among civilized men but in their fundamental form they serve a physiological purpose, *i. e.*, they modify favorably the cerebral circulation. The movements of smiling and laughing stimulate the flow of blood to the cerebrum, and help to maintain there a pleasurable hyperemia. The facial contractions in grief tend to stimulate the secretion of tears and to give a temporary anesthesia. The secretion of tears drains off substances from the blood and so affords a relief to the cerebral circulation. In short, vascular changes, glandular secretion and muscular contraction all have as their end a favorable effect upon the intra-cranial circulation.

The second part of the book, two hundred and twenty pages, discusses the social significance of the human physiognomy. It contains very little which is new or important to be said. The author supports the thesis that the face is a valuable social asset both for the child and the adult. Parents would not love their children if the latter had no faces and did not smile. The orator, the judge, the physician all make use of their faces. Indeed one is reminded of the student's

comment on the nervous system: "The nervous system, what should we do without it!" Many digressions of doubtful value are made in this part of the book; in one of these the writer asserts that he has known a man blind from birth who had a perfect notion of all the colors!

The style of the book is clear and direct, but the latter and larger part of its substance is trivial and disappointing.

KATE GORDON.

WINNEBAGO, WIS.

Anarchisme et Individualisme: essai de psychologie sociale. G. PALANTE. *Revue Philosophique*, April, 1907.

Anarchism and individualism, which are often used as synonymous, should be distinguished. Anarchism is a particular economic doctrine; individualism a mental attitude. Individualism is absolutely anti-social; anarchism may hurl anathemas at the state, but it exalts society -- the society which is a spontaneous growth. Individualism, as a mental attitude, passes through two stages, that of hopeful revolt against social determinism, and that of despairing recognition of the futility of one's revolt. Anarchism knows only the first of these stages; hence it is, in a real sense, optimistic. To this demand for the freest development of the individual, it attempts to add an altruistic principle which, in political economy, runs into communism. These two principles are in reality contradictory; hence anarchism is self-destructive, turning either into a rigid socialism on the one side, or into an individualism which is solely an attitude of mind, and as such quite compatible with the acceptance of political and social institutions very far removed from the anarchistic ideal. Individualism, however, is a permanent form of human feeling and may be expected to remain as long as society lasts.

"*Social Consciousness.*" CHAS. H. COOLEY. *Amer. Jour. of Sociology*, March, 1907.

The social mind is an organic whole, not in the sense of uniformity, but in the sense of interaction and mutual influence. The view that the individual is never really separate flows naturally from knowledge of heredity and suggestion. In the social mind are conscious and unconscious relations, — language, institutions and such influences coming under the latter head. Social consciousness arises along with self-consciousness; it may be in a particular mind or in the coöperative activity of many minds, *i. e.*, in public opinion. There is also such

a thing as a social will, which rises with the constant struggle toward clearer consciousness and which means the gradual substitution of principles for mechanism. Our moral system is a phase of the social will.

Origin of Leadership. EBEN MUMFORD. Amer. Jour. of Sociology, November, 1906-January, 1907.

In the most primitive forms of associate life, instincts and unconscious customs control, and leadership has little opportunity for development. With increase in food resources, complexity of social life and division of labor, a few individuals become leaders through marked ability. There follows either despotism, or an institutionalization of prerogatives which results in a system of caste and custom as rigid as the original instinctive control. These two phases of social control, *i. e.*, by individual power and by custom, are the two constantly interacting factors in the determination of social welfare.

ANNA LOUISE STRONG.

UNIVERSITY OF CHICAGO.

Les notions d'essence et de cause dans les mythes cosmogoniques.

PAUL HERMANT. Revue de Synthèse Historique, Février, 1907.

The argument is that human thought in these myths, just as in modern science and philosophy (cf. Herbert Spencer) postulates an original simple, homogeneous unity out of which differences are supposed to have arisen. This tendency becomes arrested in different degrees of abstraction in different races, but the tendency is always the same.

L'évolution de l'intelligence sous le régime des castes. CH. VALENTINE. Revue internationale de sociologie. March, 1907.

M. Valentine finds a benefit in castes, especially in India, on the ground that they afford specialization of occupations from birth. Social classes are constituted in order to conserve this hereditary specialization. This promotes intelligence and culture.

W. K. WRIGHT.

UNIVERSITY OF CHICAGO.

PSYCHOLOGY OF RELIGION.

The Psychology of Religious Belief. JAMES BISSELL PRATT. New York, Macmillan Co., 1907. Pp. xii + 327.

Professor Pratt has made a valuable contribution to the rapidly growing literature of the Psychology of Religion. He has focused

attention upon the nature of belief and has given it a wider historical and comparative consideration than has been given before. There is a marked unity in the book, the key to which is given in the introductory chapters upon 'The Elements of Psychic Life' and 'The Nature of Belief.' Part Two is historical and illustrates the various types of belief from the religions of primitive peoples, India, Israel and Christianity. Part Three presents 'The Present Status of Religious Belief' including belief during childhood and youth and in mature life, with a special chapter on 'The Value of God.' There is little new material in the book but it is a serious attempt to discover in familiar phenomena the controlling psychical laws and processes. This is a type of inquiry without which the description of a particular experience like conversion or the recital of religious biography seems incomplete and chaotic. The appreciation of this fact is not to be lessened by the criticisms which follow. The attempt to get an organizing point of view is commendable although the particular one taken may not seem adequate.

The first chapter presents intellect and feeling as different psychical elements, and the second makes belief primarily a matter of feeling. The familiar distinction between the 'center' and 'fringe' of consciousness is made into an antithesis which points the way to a fundamental differentiation between the rational and the emotional factors of the psychic life (p. 6). These constitute 'two principal kinds of psychic stuff.' The rational or cognitive 'center' is definite, describable, communicable. This may in turn be subdivided into ideational and sensory experience. A shifting use of words leads to unnecessary obscurity here, four pairs of terms being used in one paragraph: (1) sense perceptions and mental images; (2) perception and images; (3) sensation and memory image; (4) sensation and idea (p. 9). The 'fringe' of consciousness is divided less easily into feeling and the phenomena of the background. It is asserted that feeling and the background are clearly distinguishable, but some doubt is thrown upon this assertion by constantly including both under the designation 'feeling background' or 'feeling mass.'

Even the distinction between intellect and feeling does not seem sharp enough in many passages to serve the ulterior purpose of the author. For example, it is said that sensation and ideation are gradually differentiated out of the background (pp. 17, 19). On the other hand, thoughts affect the background and modify it (p. 23). At the close of the first chapter the contrast between the two classes of psychic elements seems to be reduced merely to a warning against an undue

intellectualism: "For the one thesis which I wish to defend, the one contention for which I really care, is that the whole man must be trusted as against any small portion of his nature, such as reason or perception. These latter should, of course, be trusted, but they should have no monopoly of our confidence" (p. 27). "No genuine belief is altogether devoid of feeling and nearly every belief of adult life is in some degree intellectual" (p. 32).

The discussion is constantly made hesitant and unconvincing by the attempt to separate thought and feeling while there is yet present the conviction that they are inextricably interwoven. This difficulty is due to the failure to relate knowledge and feeling to each other within the larger whole of practical activity. If knowledge is taken as the consciousness of means and ends in a going experience, and feeling as the sense of attraction or repulsion, success or failure in the adjustment, then the two are organically related. Religion in such a view is not limited to either thought or emotion but appears in different stages of development with varying degrees of ideation and kinds of feeling. Like all other culture forms religion would thus be held to share in the growing discipline and ideals of a rationalized experience and also in a deepening emotional reaction.

Professor Pratt does not sufficiently recognize that such terms as 'feeling' and 'inner experience' as well as concepts and logical processes are conditioned, have causes and undergo development. He seems burdened with certain survivals of the static view of mind. In speaking of the fact that the Indian religion took the direction of absolute monism he says: "The answer, I believe, is hardly to be found in climatic or geographic conditions, nor in the environment generally, but must be sought in the mental characteristics of the leaders of religious thought" (p. 89). "In general, rationalistic and empirical philosophers are born, not made" (p. 80). In the same way religious feeling is a kind of endowment or possession, a racial trait, so old and deep in the subsoil of inherited experience that reason is powerless to help or hinder it (p. 295, cf. p. 222, note 2). Therefore the course of religion runs everywhere from a primitive credulity often marked by extreme emotional excesses, up through a period of arid reasoning and doubting to the calm, quiet, mystical feeling which has nothing in common with scientific knowledge. The effort to find these three stages in all types of religion is many times labored, particularly in finding, and then accounting for finding, the religion of thought in primitive peoples.

In using the Hebrew religion to illustrate the nature of belief

there is also failure to relate the psychical phenomena to practical activities. It is true that the problem of the later Hebrews themselves was this: 'Given the righteousness of Yahweh, how interpret politics and history?' but the *psychological* problem now is, one might almost say, Given the politics and history, how interpret the righteousness of Yahweh! Professor Pratt attributes the developed Hebrew concept of God to six men and adds that their work is not to be accounted for by any facts of geographical location and race psychology. They are unique men (p. 121). Over against this it may be maintained that the development of the Hebrew idea of God accompanies social and political advancement and that monotheism is the reflex of the monarchical form of government, and the conception of God's universal rule the result of the exile.

The author is prepared by his general position not to be surprised or troubled by answers of respondents to his questions concerning the consciousness of God. He concludes that belief in God is based not on argument or authority but on a 'private [!] experience' (p. 261). A study of prayer makes it appear that God is used by people, if not always 'to find their lost children or spectacles,' yet as a means of insight, comfort and companionship. It is found that people cling to the *idea* of God's real existence, and that man values God as a larger life with which the little life *knows* [why *knows* and not feels?] that it makes connection (pp. 278 f.). The author's hope for the future of religion, which is really never experienced except by a few even of the religious community itself (p. 299), cannot be very reassuring to those who hold to the organic relation of religion with the whole of life and to the importance of an increasing rational and moral control of experience. He says: "Personal inner experience, the unreasoned (though by no means unreasonable) religious attitude toward the universe, is the only source from which religion in these days of naturalism and agnosticism, of indifference and hostility, can draw its life. Here alone is something independent of literary criticism, of scientific discovery, of philosophic thought" (p. 303).

There is an appendix to the book containing the questionnaire concerning present-day belief in God, and one giving a very valuable bibliography of various topics in the psychology of religion.

The Todas. W. H. R. RIVERS. London, Macmillan & Co., 1906.
Pp. xviii + 755.

The Todas are a tribe of 800 people in the Nilgiri hills of southern India. This treatise deals almost exclusively with their religion and their social organization, with which the older literature has not dealt adequately. In these respects the Todas are quite unique as compared with neighboring tribes and in some respects have no parallels anywhere. This is due partly to their geographical isolation. They live on a high plateau about forty miles long and ten miles wide which is only reached from the plains on any side by steep and precipitous hills.

The book bears out its claims to be the result of an attempt to apply a rigorous scientific method. For one thing the description of ceremonies and other customs are given in quite objective fashion, while the author's interpretations and inferences are put into separate chapters. The author worked under confessed difficulties, being obliged to use interpreters, having only a few months in residence among the people, and finding himself puzzled to the last moment by almost accidental penetration into deeper strata of their secrets or vague traditions (pp. 7, 447, 451, 531).

The Todas afford a striking illustration of the determining influence of industry upon religious ceremonies and symbols. They are a purely pastoral people, occupied almost exclusively with the care of their buffaloes and the ritual connected with it or based upon it. There are sacred and ordinary buffaloes. Those who care for the former and those who manage the dairies are specially set apart. They are sacred men, priests. The dairies are the temples. "The dairies favor an ascending series in which we find increasing definiteness and complexity of ritual, increasing sanctity of the person of the dairy-man-priest, increasing stringency of the rules for the conduct of his daily life, and increasing elaboration of the ceremonies which attend his entrance upon office" (p. 38). The ritual seems to have its purpose largely as a means of counteracting dangers of profanation (p. 231). The milk is a sacred substance (p. 240). Women take no part in the ritual. The prayers do not seem to be supplications so much as mere formulæ and are often carelessly 'said.' The gods are anthropomorphic and have the same social organization and the same occupation as the Todas themselves (pp. 182, 443). The gods do not seem to be personifications of the powers of nature. The author gained the impression that the ritual of the dairy 'has become all important while the religious ideas which underlie the ritual have become blurred and un-

real.' Upon this is based the inference that the religion is in the process of degeneration. It might however also be inferred that the ritual is the primary and vital element in religion as William Robertson Smith held, and that here is further evidence that ceremonials are more definite, more primary and more stable than 'ideas.'

In the social organization there are two divisions, the Tartharol and the Teivaliol, which the author surmises are the survivals of different tribes or castes which have coalesced. Intermarriage is forbidden but is practiced. The Teivaliol are the sacred dairymen for the Tartharol, but this seems to indicate that the former are servants rather than superiors. The importance of the dairyman attaches to him only so long as he is in office. Polyandry is practiced, but descent is reckoned in the male line. Women hold a subordinate position. The government is in the hands of the *naim* or council. The *naim* consists ordinarily of five men, chosen from different clans. In 1902 one man had become supreme in the council and had brought about considerable changes in the laws and regulations of the community, although these are ordinarily maintained in very rigid customary ways (p. 553). The *naim* seems chiefly engaged in settling disputes, appointing ceremonies, and in regulating sacred dairies. Crime is said not to exist among the Todas. There is no law against infanticide nor against adultery. Murder seems not to occur. Offenses against the dairy customs are regarded as sins and are punished directly by the gods. For these various ceremonies of an expiatory but not of a primitive kind are required.

The text is supplemented by numerous illustrations, maps and genealogical tables, and constitutes a most valuable scientific presentation of first-hand material.

E. S. AMES.

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Religion as a Factor in the Struggle for Life. JAMES H. LEUBA.

Amer. Journ. of Religious Psychology, December, 1906-June, 1907.

"Since the purpose of religion is to maintain and perfect life, the biological point of view should afford the larger and more fruitful outlook. From this point of vantage religion appears as a part of the struggle for life: the part involving relations with superhuman, psychic powers." In its earlier stage it is national and collective and aims at preservation and increase of the community. Later, religion becomes more individual and internal—personal, and aims at inward peace of mind. Always, it is important in the development of society.

W. K. WRIGHT.

UNIVERSITY OF CHICAGO.

FOLK PSYCHOLOGY.

The Lower Niger and its Tribes. ARTHUR GLYN LEONARD.
London, 1906.

Corresponding to the sharp opposition in the climate, between the dry and rainy seasons and in part due thereto, Major Leonard perceives a sharp dualism in the character and thought of the natives. They are incapable of any sustained effort, and think of themselves and of nature as characterized by strife and opposition — *e. g.*, day and night, moist and dry, life and death, male and female, good and evil.

To the native mind all nature is alive with spirits. The ancestral spirits of the tribe are as vitally concerned with it as are the human members. They give the latter guidance, counsel, and protection; and, since they desire reincarnation, they are dependent upon human reproduction within the tribe. Infants are carefully examined for birth marks, or other peculiar features of any sort that might reveal what ancestor is reincarnated within them.

Demons are spirits who are denied admittance to the spirit world, and also reincarnation within their tribes. This fate is due to their failure to have received proper burial rites, and does not at all depend upon their conduct during life. Doomed to perpetual disembodiment, demons become harmful and malignant. Sometimes they endeavor to take possession of living persons, and consequently methods of exorcism are numerous. All diseases are due to demoniac possession. All obsession, however, is not due to evil spirits. Good spirits appear to make revelations to the tribe, and for other purposes. Spirit possession occurs chiefly in persons of neurasthenic type, and is more common in women than men.

The principle underlying the adoration of totems, idols, fetishes, trees, rivers, animals, amulets, etc., is always the same — ancestor worship. In every case the object chosen for worship is the emblem of a spirit. Often the ruler of a tribe selects his future emblem, and after his death this is worshipped. In other cases the tribe selects an emblem for the deceased. When exigencies demand it — for instance, migration — the tribe selects other emblems for those previously revered, and the spirits usually willingly change their habitat to the new emblems.

The Natives of British Central Africa. A. WERNER. London, 1906.

This is the first of a series of popular works, written by anthropologists of reputation, in order to make better known the characteristics of the subject races of the British Empire.

The social character of the native religions is revealed in the fact that worship is now chiefly directed to the spirits of ancestors, for whom miniature huts are erected, in which they are supposed to dwell. The tribal gods also are probably the deified spirits of former chieftains. There are few traces of a connection between religion and morality. However, it is thought that a man who has killed another will suffer until he has performed some expiatory ceremony. If smallpox attacks a village where the moral tone is good, the patients will recover; but where adultery and other sins prevail, everyone who sickens will die. Thus it would seem that there are suggestions of both individual and collective moral responsibility.

The belief is general that some human beings have the power to transform themselves into animals and back again at will. The folklore abounds in instances of this, and also of the activities of animals, in which the latter are represented as leading the same kind of life, and engaging in the same activities as the men of the tribe. The theory is accepted that the 'Uncle Remus' stories are of African origin, and their characters are compared with the African originals. 'Brer Rabbit' is the Yao *Sungula*, an African hare, and both 'Brer Wolf' and 'Brer Fox' seem to have taken the place of the Hyena. To be sure, there is more blood spilled in the African originals, but the interest does not rest in this feature any more than in our children's story of *Jack the Giant Killer*, but rather in the cleverness by which the weaker party turns the tables upon the stronger. All the members of the tribe know tales which they can repeat, and they vie with one another in attaining excellence in this accomplishment.

W. K. WRIGHT.

UNIVERSITY OF CHICAGO.

Savage Childhood: A Study of Kafir Children. DUDLEY KIDD.
London, A. and C. Black, 1906. Pp. xiv + 314.

The most interesting feature in this book from the standpoint of social psychology is the point made by the author that the Kafirs have two distinct words for spirit, corresponding in general to the distinction between an individual spirit and an ancestral and corporate spirit. "The *idhlozi* is the individual and personal spirit born with each child — something fresh and unique which is never shared with any one else — while the *itongo* is the ancestral and corporate spirit which is not personal but tribal, or a thing of the clan, the possession of which is obtained, not by birth, but by certain initiatory rites. The *idhlozi* is personal and inalienable, for it is wrapped up with the

man's personality, and at death it lives near the grave or goes into the snake or totem of the clan, but the *itongo* is of the clan, and haunts the living-hut; at death it returns to the tribal *amatongo* (ancestral spirits). A man's share in this clan-spirit (*itongo*) is lost when he becomes a Christian or when he is in any way unfaithful to the interests of the clan, but a man never loses his *idhlozi* any more than he ever loses his individuality." This distinction has not been understood by Europeans, and even the natives themselves now confuse the two terms, but the author feels confident from a large number of inquiries as to the specific ways in which the terms could be properly used that the distinction was formerly clear. The psychologists have of course found the distinction a convenient one for purposes of analysis, but that the Kafirs should have found a distinct name for each of these terms is certainly an unexpected pleasure. The book contains much further interesting material concerning the dawn of self-consciousness, the rites connected with infancy, the developing ideas, and particularly the plays and games.

J. H. T.

The Influence of Magic on Social Relationships. E. WESTERMARCK. (Sociological Papers, Vol. II.) London and New York, Macmillan & Co., 1906.

Dr. Westermarck holds that primitive peoples not only make a distinction between natural and supernatural powers, but also between supernatural will-power and supernatural energy. It is this latter, the supernatural mechanical power, which is applied in magic and taboo. In two particular respects does he think that this magic has influenced social relationships: in the increase of the authority of the parent and in the consideration shown to strangers. The curses and blessings of a parent are regarded as peculiarly efficacious. Since they frequently have no dependence on desert, they are regarded by Westermarck as meaning, not a good or evil conferred by a superior will, but an energy transferred in some way to the person concerned. Through physical contact with a person's body, clothes or food, a stranger acquired the power of thus blessing or cursing him. This, thinks Westermarck, explains why a stranger was protected as soon as he became a 'guest' and why the breaking of the right of 'guest-friendship' was supposed to incur such terrible and mysterious penalties.

As one would expect from the author the article contains conclusions drawn from an abundance of material. One is tempted to

wonder, however, to just what extent primitive men were accustomed to analyze their experiences into natural and supernatural, and then still further differentiate them into supernatural will-power and supernatural mechanical energy. Even a highly civilized mind is seldom so analytical, except under the stress of some scientific problem.

ANNA LOUISE STRONG.

UNIVERSITY OF CHICAGO.

Aus Kultur und Leben. Gesammelte Essays. JOSEF KOHLER.
Berlin, 1904.

Among the essays in this volume of interest to the social psychologist are those upon the nature and purpose of universal history, group marriage, the matriarchate, and the origin of the religious consciousness. The generally similar character of superstitions and folk lore and customs everywhere is illustrated by instances taken chiefly from Baden and the German colonies in Africa — *e. g.*, the artifices of witchcraft, ordeals to reveal the divine judgment, burning of candles about a corpse to illuminate the spirit's journey to the other world, precautions to prevent the return of dead spirits at times of death, birth, and marriage, etc. Such similarities indicate that there is no fundamental difference between the present cultured and natural races, and argues for the future rise of civilization among the latter.

W. K. WRIGHT.

UNIVERSITY OF CHICAGO.

DISCUSSION.

'VISION DURING DIZZINESS' — A CORRECTION.

In his review of my paper on vision during dizziness, Dr. Dunlap states that "The most remarkable of the results of these experiments is that in all of them the visual field moved in the direction of the rotation during rotation and in the opposite direction after rotation. The ordinary experience (as described by Delage in the passage quoted by Holt), is that during rotation the apparent movement of the field is in the direction opposite to that of the rotation and after rotation ceases the field apparently moves in the direction in which the rotation was" (PSYCH. BULL., IV., 313). Dr. Dunlap has misunderstood my paper in several points: I did not report any such remarkable result as that 'the visual field moved in the direction of rotation during rotation,' nor did Delage state in the passage quoted by me, that 'after rotation ceases the field apparently moves

in the direction in which the rotation was.' Both of these assertions would be untrue, as anyone can ascertain by twirling himself on his toes for a few seconds—obviously enough the objects about one appear to whirl, *both during and after* rotation, in a direction contrary to the rotation. And I find in my paper no statement that is inconsistent with this fact, although there are several that are inconsistent therewith in the review. In view also of two or three fallacious inferences which Dr. Dunlap made from certain of my statements, I must beg any who may possibly make use of my small contribution, to refer to the paper itself and not to the review.

EDWIN B. HOLT.

HARVARD UNIVERSITY.

BOOKS RECEIVED FROM NOVEMBER 5 TO DECEMBER 5.

Darwinism Today. V. L. KELLOGG. New York, Holt & Co., 1907.
Pp. xii + 403.

American Philosophy: The Early Schools. I. WOODBRIDGE RILEY.
New York, Dodd, Mead & Co., 1907. Pp. x + 595.

The Lesson of Evolution. F. W. HUTTON. 2d enlarged ed. London and Christchurch, New Zealand, privately printed, 1907.
Pp. xxiv + 301.

A Statistical Study of Literary Merit. F. L. WELLS. Arch. of Psychol., No. 7. New York, Science Press, 1907. Pp. 31.

The Cheyenne Indians. J. MOONEY. Mem. of the Amer. Anthropol. Assoc., 1907. Lancaster, Pa., New Era Co. Pp. 361-495.

Studien zur Hirnpathologie und Psychologie. A. PICK. Berlin, Karger, 1908 (for 1907). Pp. 62.

Les Savants et la Philosophie. G. RAGEOT. Paris, Alcan, 1908 (for 1907). Pp. 179. 2 fr. 50.

Morale des Idées-Forces. A. FOUILLÉE. Paris, Alcan, 1908 (for 1907). Pp. lxiv + 391. 7 fr. 50.

Die Reproduktion und Assoziation von Vorstellungen. A. WRESCHNER. Ergänzungsband 3, to *Zeitsch. f. Psychologie*. Leipzig, Barth, 1907. M. 10.

Beyond Good and Evil. F. NIETZSCHE. Trans. by H. ZIMMERN. New York, Macmillan, 1907. Pp. xv + 268.

The Ethical Significance of Feeling Pleasure and Happiness in Modern Non-Hedonistic Systems. W. K. WRIGHT. Philosophic

Studies of the University of Chicago, No. 1. Chicago, University of Chicago Press, 1907. Pp. 95. 50c.

Days Off and Other Digressions. HENRY VAN DYKE. New York, Scribner, 1907. Pp. 322. \$1.50

The Perpetual Visiting and Pocket Reference Book, Including Information in Emergencies from Standard Authors. St. Louis, J. H. Chambers & Co. (No date.) Pp. 24 + 100.

Die Mechanik des Geisteslebens. M. VERWORN. Leipzig, Teubner, 1907. Pp. 104.

NOTES AND NEWS.

WE have received announcement of the forthcoming *Sociological Review*, to be published by the Sociological Society of London through Messrs. Sherratt & Hughes (60 Chandos St., London, W. C.). This *Review* will take the place of the annual volume of *Sociological Papers*. It will be a quarterly (No. 1 to appear January 15, 1908; annual subscription 11 s. 6 d.) under the editorial charge of a committee of which Professor L. T. Hobhouse, University of London, is chairman.

THE following are taken from the press:

L. E. EMERSON, Ph.D. (Harvard), has been appointed instructor in philosophy in the University of Michigan.

PROFESSOR JOHN DEWEY, of Columbia University, will lecture before the School of Education of the University of Illinois during the second week of December.

PROFESSOR R. M. WENLEY, of the University of Michigan, has been appointed to the Baldwin lectureship for the year 1908-9.

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