

THE
PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE FOURTEENTH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, CAMBRIDGE, MASS., DECEMBER 27, 28 AND 29, 1905.

REPORT OF THE SECRETARY.

The fourteenth annual meeting of the American Psychological Association was held at Harvard University, Cambridge, Mass., on Wednesday, Thursday and Friday, December 27, 28 and 29, 1905, in affiliation with the American Philosophical Association. About one hundred members of the two associations, including sixty-five belonging to the Psychological Association, were in attendance at the various sessions, some of which also attracted a large number of outsiders. Most of the members were accommodated in dormitory rooms, thanks to the courtesy of Harvard and Radcliffe students.

All the sessions were held in Emerson Hall, the new building devoted to philosophy, psychology, and sociology. To signalize the formal opening of this building, special exercises were held on the afternoon of Wednesday, December 27, Professor Münsterberg presiding. Addresses were made by President Eliot and Dr. Edward Waldo Emerson. These exercises were immediately followed by a joint discussion with the American Philosophical Association on 'The Affiliation of Psychology with Philosophy and with the Natural Sciences,' with Professor Dewey, President of the Philosophical Association, in the chair. President Calkins was in the chair at all the other sessions of the Association. On Thursday afternoon, immediately following the business meeting, the Association went into conference on the subjects of 'Coöperation between Laboratories and Departments of Different Institutions' and 'Elementary Instruction in Psychology.' Papers were grouped and distributed among the other sessions, so far as possible, with a view to unifying their several programs. On Wednesday morning most of the papers were on

comparative and abnormal psychology. Thursday morning was given up to a set discussion on the 'The Definition of Feeling,' followed by other papers on general psychology. At twelve o'clock Professor Wilhelm Ostwald addressed the Association, by invitation, on 'Psychical Energy.' The sessions of Friday were devoted to the section of experimental psychology, the papers of the morning dealing with related problems in vision, those of the afternoon being of a miscellaneous character. At the close of the formal program there followed an inspection of the new Harvard Laboratory and the demonstration of apparatus used in current researches.

The members of the Association were hospitably entertained at luncheon by the Harvard Corporation at the Harvard Union on Wednesday at 1 o'clock, and at a reception tendered by Professor and Mrs. Münsterberg at their home immediately after the address of the President on Wednesday evening. Most of the members of the Association heard the presidential address before the Philosophical Association on Thursday evening, after which a joint smoker of the two Associations was held at the Harvard Union. Visits were made to Wellesley College, the McLean Hospital, and the Massachusetts Institute for Feeble Minded, by invitation of these institutions.

At the regular business meeting held on December 28, the following was transacted: Election of officers for 1906: *President*, Professor James Rowland Angell, University of Chicago; *Members of the Council to serve three years*, Professor Mary Whiton Calkins, Wellesley College, and Professor C. E. Seashore, University of Iowa.

The following new members were elected: Dr. Elizabeth Kemper Adams, Smith College; Professor Bird Thomas Baldwin, West Chester Normal School, Pa.; Dr. J. Carleton Bell, Wellesley College; Mr. Edward Herbert Cameron, Yale University; Mr. Donald John Cowling, Yale University; Professor Kate Gordon, Mt. Holyoke College; Professor Edmund B. Huey, Western University of Pennsylvania; Professor Charles Hughes Johnston, State Normal School, East Stroudsburg, Pa.; Dr. Irving King, Pratt Institute; Dr. Adolf Meyer, New York State Pathological Institute; Dr. Noami Norsworthy, Teacher's College; Mr. James P. Porter, Clark College; Dr. Morton Prince, Tufts College Medical School; Miss Margaret S. Pritchard, Philadelphia Normal School; Dr. James J. Putnam, Harvard Medical School; Dr. Eleanor Harris Rowland, Mt. Holyoke College; Professor Henry A. Ruger, Colorado College; Dr. Boris Sidis, Brookline, Mass.; Dr. Theodate L. Smith, Clark University; Dr. Edward G. Spaulding, Princeton University; Professor Herman

Campbell Stevens, University of Washington; Professor Herbert Stotesbury, Temple College.

The Secretary reported on behalf of the Council that an invitation from the University of Illinois to the installation of President Edmund Janes James on October 17, 18 and 19, 1905, had been accepted, and that by request of the Council Professors Cattell and Jastrow represented the Association.

Upon recommendation of the Council, it was voted to amend Article IV. of the Constitution to read as follows: "Annual subscription. — The annual subscription shall be one dollar in advance." An affirmative vote having been polled at two successive meetings, the Constitution now stands amended as above.

Upon recommendation of the Council, it was voted to accept the invitation of Columbia University to hold the next annual meeting in New York, in affiliation with the American Association for the Advancement of Science and the American Society of Naturalists, with the understanding that the American Philosophical Association decide to meet at the same time and place, power being given to the Council to arrange otherwise in case circumstances should arise to make a change of plan desirable.

The Council presented a report from the Committee on Bibliography, which appears below, and recommended that the Committee be discharged with the thanks of the Association for its services and that no action be taken until after the appearance of Dr. Rand's bibliography. On motion, this recommendation was amended to the effect that the Council be instructed to recommend action after an examination of Dr. Rand's bibliography, and was adopted as amended.

Upon recommendation of the Council, it was voted to instruct the new Council to consider the whole question of the guardianship and utilization of the Association's accumulated fund and to report upon the same at the next annual meeting.

Upon motion of Professor Thorndike, it was voted that the Council be authorized, at its discretion, to allow the Secretary traveling and other expenses incident to the arrangement of the program and the preparations for the meetings.

A vote of thanks was extended to the authorities of Harvard University and especially to the members of the Department of Philosophy for the courtesy and generous hospitality shown to the Association.

REPORT OF THE COMMITTEE ON BIBLIOGRAPHY.

To the American Psychological Association:

Your Bibliographical Committee would respectfully report that on the general questions committed to them they have nothing to add to what was contained in their report to the St. Louis meeting, 1903, a copy of which is appended.¹

On the question of expense, with regard to which the Association requested further information at its Philadelphia meeting last year, the committee would report as follows:

The committee knows of no way of determining the expense exactly in advance of the actual preparation of the bibliography. From the best data in their possession they estimate the expense as follows:

Purchase of suitable portions of Prof. Leuba's bibliography	\$ 150.00
Clerical work and cards for the 6,000 or 7,000 titles necessary to complete the bibliography, estimated to include a total of about 12,000-15,000 titles	150.00
Salary of the executive agent recommended in the St. Louis report.....	1,000.00
Printing and publishing an edition of 500 copies in the style of the 'Psychological Index' ²	1,020.00—1275
Total.....	\$2,320.00—2575

Respectfully submitted,

The Committee on Bibliography,

By E. C. SANFORD, *Chairman.*

REPORT OF THE TREASURER FOR 1905.

DR.

To receipts from retiring Treasurer.....	\$2,667.21
Dues from members.....	216.30
Total	\$2,883.51

¹This report to the St. Louis meeting, 1903, was published in full in the Proceedings of that meeting (this BULLETIN, February 10, 1904), and is not here reproduced.

²This estimate is given at the request of the Association; the committee in an earlier report advised against immediate printing of the bibliography. *Vide* Report of 1902.

CR.

By expenditures for printing (including printed stationery).....	\$	50.80
Postage and special stationery		20.45
Clerical assistance.....		38.64
Proceedings.....		6.64
Smoker at Philadelphia, 1904.....		30.90
Total		<u>147.43</u>
		2,736.08
Accumulated interests on deposits, July 1, 1905.....		<u>32.74</u>
Total		<u>\$2,768.82</u>
Audited by the Council.		

WM. HARPER DAVIS,
Secretary and Treasurer.

ABSTRACTS OF PAPERS.

A Reconciliation of Structural and Functional Psychology. President's Address. By MARY WHITON CALKINS.

Psychology is the study of the conscious self. Not the psychic event — the mental process or idea — is the basal fact of psychology but the self from which every psychic event is a mere abstraction. This self of the psychologist must be sharply distinguished, first, from the philosopher's self, the object of metaphysical study; second, from the biologist's self, the animal body which 'has consciousness,' and, finally, from the sociologist's self, the self regarded as a member of a community.

The scientific study of the conscious self involves two essential procedures: First, the analysis of its consciousness into structural elements, sensational, affective and the like, and, second, the enumeration and classification of its relations with its environment, that is, with other selves and with objects. The first of these procedures is the distinctive feature of structural psychology; the second is the fundamental motive of functional psychology. The essentials both of structural and of functional psychology are thus combined in psychology as study of a self; for this self is both a complex of elemental experiences and a complex of relationships to its environment. (To appear in full in the PSYCHOLOGICAL REVIEW for March.)

The Relations of Muscular Activity to the Mental Process. By GEORGE V. N. DEARBORN.

While denying the hereditary, *ex cathedra* supposition that the brain is the sole correlate of the mind, the present notes suggest only

some of the claims of muscular protoplasm for consideration as representing a part of the mental process. The burden of proof rests upon those who limit the physical basis of consciousness to the nervous system, for unless consciousness is of the nature of a secretion such a view is unwarranted.

The *a priori* criteria of correlation are not very clear. But, if intricacy of structure, subtlety of metabolism, or variety of forms of energy be the criterion, form of protoplasm excels muscle as a correlate. A criterion perhaps more likely is motion, one of the basal characters of life in both its psychic and somatic aspects. It is certain that muscle represents inherent molar movements better than any other tissue and molecular motion at least as well as any. Recent physiological research shows that muscle tonus (a partial balancing of varying contractions) pervades all muscle always. From the other side psychology in its theory of feeling demonstrates both the universality of muscular activity and the probable continuity of affective tone.

Muscles are not separate organs for the most part, but probably a nearly continuous vitally active tissue pervading practically the whole body and forming half its mass. There are more than six hundred 'voluntary' muscles, and muscle of a reflex sort is all over the rest of the body save in the bones, the nervous system, and the alveoli of glands. 'Voluntary' muscles serve relatively new combinations of movement, while the 'reflex' muscles assist the vegetative movements. Both alike, however, are served by myriads of afferent and efferent neural end-organs and thus share alike in the highly complex 'motor' mechanism of the organism, correlate of the fusion-current of consciousness. But these varied end-organs serve the autonomous muscle-protoplasm; for the balance of recent evidence, histologic and physiologic, goes to prove both the unity and the autonomy of muscle tissue.

All these properties of muscle combine to help supply the criteria of psycho-physical correlation lacking in the cerebral cortex and also simplify the theory of bodily movement.

How can the Relation of the Conscious to the Subconscious be Best Conceived? By IRVING KING.

This paper criticises the common mode of conceiving consciousness after the analogy of the visual field. As against this view it is here suggested that consciousness be conceived as a point, correlated not with neural activity, *per se*, but with a certain organization of neural processes. The *point* of consciousness is modified by outlying neural processes as well as those most directly concerned in the adjustment in progress. This 'point' is also self-consciousness.

From the standpoint here proposed the subconscious is not dim consciousness, but outlying neural processes and dispositions which in a vague way affect the movement of the central organization of neural processes with which the *point* of consciousness is correlated. (This paper appeared in full in the *PSYCHOLOGICAL REVIEW*, for January, 1906, under the title, 'The Problem of the Subconscious.')

The Senses and Intelligence of the Japanese Dancing Mouse, with Demonstrations. By ROBERT M. YERKES.

Further Study of the English Sparrow and other Birds. By J. P. PORTER.

A vesper sparrow, a cow-bird, four English sparrows, and two pigeons have been made the subjects of experimentation. All except the pigeons, which were not tried with this apparatus, learn a simple maze in from twenty to thirty trials. Ten memory tests thirty days later with no intervening tests show a surprising good memory. A reversal of the maze gives rise to much interference during the first tests, but this is quickly overcome. In all these tests the vesper sparrow shows least ability to profit by experience. The English sparrows are little, if at all, superior to the cow-bird.

The results with a food-box opened by pulling or pushing any one of four strings just to the left of the door indicate that the cow-bird, a male dovecot pigeon and a female passenger pigeon learn in much the same way, if not quite so rapidly, as the English sparrows. There are more failures later in the series, especially for the male pigeon. Memory tests thirty days later give much the same results as before, a second memory series one hundred and twenty days later for the cow-bird and one hundred and forty days for the male pigeon indicate that much more is forgotten than during the shorter interval. The lapse of time leads to a reversion to an earlier method of opening the door.

The cow-bird learns to distinguish between the designs and colors used with the English sparrow in an earlier study (reported at the St. Louis Meeting of the Association and published in *Am. Jour. Psych.*, July, 1904). With the more difficult designs the sparrow is better. With the colors there is little difference. Some tests with forms indicate that the cow-bird was learning the triangular-shaped box. My earlier results with the English sparrow were negative.

The English sparrow when observed in confinement with the above named birds or out-of-doors has shown itself more capable of fear, courage or boldness, caution and independent action. It is more of a leader, more persistent, and more active. The cow-bird at times is

as wary but not so bold. The pigeons are very timid, have a keen sense of vision, and seem easily distracted. The vesper sparrow has less fear, and seems much more trustful than her nearer relative.

The Habits and Instincts of Spiders, Genera Argiope and Epeira.

By J. P. PORTER.

The spiders, *Epeira trifolium*, *sclopetaria*, *strix*, *patagiata*, *corticaria*, and *angulata*, and *Argiope transversa* and *riparia* have been studied. Most of these have been observed both in and out of doors.

All have shown great differences in degree of development and some in color markings, especially *E. trifolium*. There are great variations in the selection of a place for the web and, in the case of those that build one, of the nest; also in the material for a nest. Observation of the laying of foundation lines for the web shows that with *A. transversa* and *E. trifolium* it is a 'trial and error' affair. In the actual making of the web there is much variation due in part to the site chosen. Any part may be made stronger if need be. Webs may vary from the normal slant, there may be more spirals above than below the center, which is equivalent to turning the web upside down, very often the 'winding stair' may be partly or wholly omitted, the center of the web left undarned, the side-guards or screens, one or both, left off. Counts of elements of five different parts of the web (the supports, radii, outer spirals above, and below, and the inner spirals) covering many individual webs all give a very large 'mean variation' and 'probable error.' Since the young spin such perfect webs, very often more perfect than those of the old, it would seem best to look upon these variations as lying within the possibilities of instinct. However, further observations covering the complete life cycle of the same individuals are very desirable. The 'coefficient of variability' is very large even for webs spun in places of the spiders' own choice. Some of these variations are perhaps marked enough to constitute the starting points of new habits and thus possibly of new species.

The first appearance of light in the morning seems to be the stimulus which sets *A. riparia* and *transversa* and *E. trifolium* to spinning. Nightfall is the time for old *E. sclopetaria* and *angulata*. The young of these spin at almost any time of day.

The feeding habits show adaptation to kind of prey. There is some evidence of intelligent adaptation to what is not good for food.

The so-called 'feigning instinct' is not a 'kataplectic' state and seems to be controlled. The instinct to vibrate the web is strongest in

the *Argiope*. They give a rhythmic swing to the web when disturbed. This led to a test of their range of attentive vision, which is very probably ten to twelve times greater immediately after they have been disturbed than when at rest.

Spiders behave in a manner which in higher animals would be credited to fear, anger, courage, attachment to web, nest, cocoon or young. Their sexual feelings are very strong. They seem to be cautious and persevering. The females seem to show powers of expectant attention and voluntary control.

The courtship or the approach of the male to the female is made up of a number of rather definite steps. The male profits by the helplessness of the female during moulting, and copulation occurs then. The process is variable.

There would, therefore, seem to be much in spider habits and instincts to remind us of Loeb's tropisms, yet a sufficiently plastic basis for adaptations, some of which fall within the possibilities of instinct, while others, perhaps, are cases of intelligent control.

Variations in the Nests of a Spider, with a Comment on the Measurement of the Variability of Instinct. By WM. HARPER DAVIS.

A series of 222 nests of another species of spider, which binds grass or sedge blades in a peculiar fashion to form boxes for the protection of its eggs, was exhibited and a preliminary report on the variations and their causes was presented. Marked individual differences, including several anomalous types, appear, which probably represent (apart from accidental variations due to mechanical conditions) both variations in instinct and ingenious 'accommodations' to unusual conditions. Variations in length of the regular 'modal' forms conform closely in their distribution to the normal curve of frequency. In spite of the undoubted presence, in this case, of numerous factors which it is difficult to eliminate, it is thought that an objective measurement of the variability of instincts may be possible.

The Ant-queen as a Psychological Study. By WILLIAM MORTON WHEELER. (This paper will appear in full in an early number of the *Popular Science Monthly*.)

Conscious Experiences and the Somatic Group of Senses. By EDWARD COWLES.

This refers to the physiological reactions of the body whose influences are brought to bear upon conscious experience through the group of senses which may be designated as *somatic*. In Professor San-

ford's address to this Association in 1902 on the relation of psychology and physics he describes the conscious experiences that may be called physical phenomena; these belong chiefly to the senses that mediate the 'life of relation' with the world outside of our own bodies, — the 'physical group of senses.' The method of psychology includes the foregoing and deals with all others that belong to inner experiences. This conception of a relation between conscious experiences and outer physical phenomena implies an organism, with its special 'physical group of senses' in touch with the outer contacts, acting as a medium of transmission between the two. This suggests that this medium may be conceived as forming also a *somatic group of senses* in the paths of communication, which adds to its reports of contacts with the other 'life of relation' a multitude of returns, with all their variations, from its own physical workings; we do not recognize for the most part the sources of these sensations, whether of well-being or ill-being, yet they have a controlling influence upon our minds. Thus three groupings are indicated of the functions of the sensory mechanisms of conscious experience: (1) the physical group of senses of the outer 'life of relation'; (2) the somatic group of senses of the inner life, — our conscious experiences of our own bodies; (3) the central psychical life, which includes both of the other groups besides those belonging distinctly to the mental life.

The interest of this to psychiatry is that comparatively little attention has been given to this inner sensory field; yet here are the conditions and the very material of bodily and mental stimulations and sensations with which the mental work is done. These explaining principles have been almost wholly omitted from the accepted formulæ of the conceptions of modern advanced psychiatry, which has chiefly concerned itself with the motor aspects of mental life and expression. These physiological references are needed to explain many of the symptoms of the psychoses and should have their full value in the formulation of the principles of mental physiology and psychiatry.

The Nature of Hypnotic and Post-hypnotic Hallucinations. By
BORIS SIDIS.

Hypnotic and post-hypnotic hallucinations have been studied more for amusement than for scientific analysis. The validity of the hypnotic hallucination has passed unchallenged, because of the doubtful assumption of the central origin of hallucinations, an assumption current among psychologists and especially among psychiatrists who still pin their faith to 'images and idols' and accept uncritically the introspective account of the insane and dements, as to the nature of their

hallucinations. The central origin of hallucinations is highly doubtful, and the hypnotic hallucination certainly does not support it.

Workers in hypnosis have too readily, eagerly and credulously accepted the suggestions of their subjects. Although the introspective account of hypnotic subjects is more valid and trustworthy than that of the insane or of dements, still it should be taken guardedly and should certainly not be accepted uncritically on its face value. Experiments and observations carried out by the writer on many subjects tend to prove that hypnotic hallucinations are neither of peripheral nor of the alleged 'central' origin, but are essentially *spurious* in their character. The so-called hypnotic or post-hypnotic hallucination is really not experienced by the subject. *The hypnotic or post-hypnotic hallucination is not a hallucination, but a delusion.* (This paper is to appear in full in the forthcoming number of the *Journal of Abnormal Psychology.*)

The Psychology of Sudden Conversion. By MORTON PRINCE.

The psychology of sudden conversion is not always the same. This study was, therefore, limited to a particular type of cases which might be exemplified by the case of Ratisbonne, described by William James in his *Varieties of Religious Experience*. According to James' theory of sudden conversion, there has been going on for some time previous to the crisis, in the ultramarginal or subconscious field of thought, an incubation of motives deposited by the experiences of life. Finally, when these motives have come to maturity, they burst forth, like a flower, into the conscious life of the individual.

Thus far no one has demonstrated, experimentally or otherwise, the previous existence of such subconscious ideas in any specific case. The value of the reader's observation lay in the fact that he had had an opportunity to examine experimentally in hypnosis the antecedent content of consciousness in an instance of sudden ecstasy with change of view and belief. The whole, although not of a religious nature, was in every other way (that is, in principle) identical with religious conversion of the type in question. Indeed, religious ideas played a prominent part in the mental content. The subject had betaken herself to church, thinking that through self-communing and prayer she might find some way out of her difficulties. As she communed with herself, still in a condition of self-despair and hopelessness, suddenly all became changed and she was filled with a great emotion of joyousness and of well-being, etc.; in other words, a condition of ecstasy developed, with a belief in her own miraculous cure and that she had

had a visitation. With this belief, exalted religious feelings became mingled.

For purposes of examination the subject in the case reported was put into two different hypnotic states, both able to give an intelligent account of what had happened and was unknown to the subject. The first hypnotic state was able to give only a partial account of what happened in the church and of the content of the subject's mind. The second hypnotic state was able to give a very full account.

In this case, of which a full account has been reserved for the author's work, *The Dissociation of a Personality*, there was then no incubation or flowering of subconscious ideas, but simply emotions of the moment, which, developing in a trance state and persisting after waking as a state of exaltation, had suggested the beliefs which took possession of her mind. The part played by the subconscious mind consisted in furnishing emotions rather than ideas.

Many of the cases of sudden conversion recorded in literature are of this type in that the crisis consisted of a trance-like or hypnoid condition into which the subject fell. The state of ecstasy followed this trance condition, and probably had the same psychological mechanism. St. Paul's conversion was probably of this type.

General Discussion on the Affiliation of Psychology with Philosophy and with the Natural Sciences. Participants: HUGO MÜNSTERBERG, G. STANLEY HALL, FRANK THILLY, JAMES R. ANGELL, A. E. TAYLOR, and WILHELM OSTWALD.

PROFESSOR MÜNSTERBERG contended for the affiliation of psychology with philosophy, as provided for by Emerson Hall. His remarks will appear in the forthcoming second volume of the *Harvard Psychological Studies*, as part of an essay under the title 'Emerson Hall.'

PRESIDENT HALL. — The speaker took the opposite view from Professor Münsterberg and would withdraw psychology from philosophy and affiliate it with the natural sciences, since, from his point of view, psychology, provisionally defined, is "a description as accurate as may be of all those facts of psychic life, conscious and unconscious, animal and human, normal and morbid, embryonic and mature, which are demonstrable and certain to be accepted by every intelligent unbiased mind which fully knows them. They must also be so ordered like to like, and organized, that they can all be known with the least trouble. The best plan of organization when possible is evolutionary." Under this definition, psychology is excluded from no field of experience, conscious or unconscious, religious, social, genetic

or individual, that can be studied on the basis of solid empirical data, and hence its closest allies as an inductive science in the future must be biology, physiology and anthropology. The nature of soul no more concerns it than does the ultimate nature of matter and motion concern physics. Such discussions belong to philosophy, the history of which the speaker would insist upon as a part of the training of every experimentalist, but would avoid too prolonged a lingering in the philosophical fields, lest it unfit for dealing with facts. Psychology is yet in its dawn, and its striving should be toward the goal of becoming a true natural history of the soul. (Taken from *Amer. J. of Psychol.*, XVII., 145. The remarks will be published in full in *Science*.)

PROFESSOR THILLY. — The fact that mind can be studied in connection with matter does not make psychology a branch of natural science. Psychology is interested in a unique body of facts, and a perfect knowledge of their material antecedents would not give us a knowledge of mind as such. The argument that physiological states are the real things and brain knowledge the only scientific knowledge rests on the questionable metaphysics of materialism. Even if it were true, the psychologist would go right on studying the so-called effects of brain states, for knowledge of brain motions would not tell the whole story; but our knowledge of what is going on in the brain does not yet form a complete science. Besides, the brain physiologist cannot take a step in the construction of his hypotheses without psychology. If the psychical states could be deduced from their physiological causes, the physiologist could ignore psychology, but there would still remain a more direct way of studying mind for the psychologist. The argument is also urged that the mental series does not form a continuous line, that a closed causal nexus and hence science exists for external nature only, and that to be scientific psychology must become a natural science. We answer: More careful observation may disclose the missing links, and where this fails we can have recourse to hypotheses. Besides, there are gaps in the physiological line also, which are bridged over by theory. Finally, if psychology is impossible because of breaks in the mental causal series, cerebral physiology is impossible for analogous reasons and because we then have no key with which to open the secrets of the brain. The view that psychology is a natural science because it employs the methods of science is also untenable. The psychologist uses the objective methods but introspection is everywhere his basis and guide. Experiment facilitates, corrects, and controls introspection. Measurement forms but a

small and unimportant part of the problem. In conclusion, affiliation with philosophy is in the interests of both fields. Psychology is indispensable to the other philosophical studies, while the aims and problems peculiar to the latter help to give direction to the former. Interest in philosophical problems fixes attention on mental states, which the scientist is apt to ignore because he can find no physical antecedents for the same, acts as a safeguard against a false mental atomism, and tends to keep in view the unity of mind. The relation of psychology to metaphysics is not to be conceived as an *a priori* construction of the facts of psychology from metaphysical principles. But if dependence on metaphysics means that psychology must start out from some broad assumptions and must have recourse to hypotheses in attempting to explain, then psychology depends on metaphysics. There is no absolutely presuppositionless psychology.

PROFESSOR ANGELL. — Ought psychology to continue indefinitely its allegiance to philosophy or should it enroll its name under the banners of the natural sciences? Professor Münsterberg has warmly defended the first alternative. President Hall is no less fervent in his espousal of the second. For my own part I refuse to recognize either the necessity or the wisdom of taking any overt measures looking toward the one step or the other. And the absence of such a necessity I regard as eminently fortunate, for psychology is just beginning to gain the respect of the scientists and she has not as yet wholly lost that of the philosophers. She is therefore in too delicate a position gratuitously to alienate the sympathy and support of either of these powerful allies.

As a matter of fact, apart from the question of the label by which we shall classify psychology — and this is evidently a somewhat academic issue — I do not see how any serious divergence of opinion is possible upon the point under consideration. That our Harvard friends have put their psychological laboratory in this superb building devoted also to philosophy does not raise in my mind the question as to any impropriety in this cohabitation, but rather a sense of the gratification which each party to the contract ought to feel in such admirable companionship and in such stately and appropriate quarters. Certainly I should gladly accept for myself, were it offered, a laboratory so excellently appointed, even though my neighbors in the building were such psychological outcasts as lawyers or doctors. Mere physical juxtaposition means little, unless it embodies an avowal of spiritual dependence or affiliation which evidently is no necessary part of it.

In this particular instance, however, there is a high degree of spiritual intimacy which must make the companionship of the contracting parties extremely profitable to both. But this is by no means to maintain or admit that this companionship is the only one congenial and advantageous to them. Everyone knows that psychology has for the most part a philosophical lineage, and that certain highly important foundations of psychology, even when it is regarded as a natural science, must always be of a philosophical character. Any proposition, therefore, permanently to estrange these two must be regarded not only as ill-advised, but also as impracticable. On the other hand everyone is equally well aware that in many of its methods and most of its ideals modern psychology is approaching the position of the sciences, and especially the biological sciences. Consequently, unless one is ready to indict the whole spirit of the contemporary movement, it seems imperative to countenance and encourage the most intelligent appreciation by psychologists of those forms of scientific procedure which they are likely to wish to appropriate. Such intelligent familiarity they can only attain through intimate association with these sciences.

The general intellectual poise which philosophical training affords cannot be sacrificed by psychology without the most disastrous consequences. But at the same time psychology just as surely needs the invigorating contact of the natural sciences. Indeed, it does not seem too much to claim that psychology has a peculiar mission at this precise juncture in the bringing together of the interests of philosophy and natural science. Certainly no other science is in so strategic a position for the accomplishment of this purpose.

PROFESSOR TAYLOR. — The affiliation of psychology appears to be with the natural rather than with the philosophical sciences. It is distinguished from the abstract philosophical sciences of formal logic and mathematics by its dependence on empirical premises ultimately based upon the testimony of direct perception, involving in their meanings reference to a particular moment of time. In this respect it resembles the empirical sciences of empirical nature. Nor do the allegations that it deals only with the 'individual objects' and non-quantitative processes afford a satisfactory basis for distinguishing it from the natural sciences. It differs again from both the abstract and concrete philosophical sciences (ethics, philosophy of religion, philosophy of history, etc.) in making no use of the concept of ideal norms of value.

The Definition of Feeling. By HENRY RUTGERS MARSHALL.

The word 'feeling' is used in common speech to designate (1) touch, (2) the organic sensations, (3) emotion, (4) pleasure-pain, and (5) mere emphatic experience as such. An examination of each of these forms of our mental life shows that feeling can be identified with no one of them.

A search for some emphatic characteristic of all the forms of experience in the description of which the word feeling is used by psychologists leads us to see that we have such a characteristic in 'subjectivity,' in the use of which word we express the fact that the mental states thus referred to bear a close relation with the empirical ego.

This leads to the thesis that 'feeling proper' is a certain vague mental form which when more clearly defined develops into the empirical ego of self-consciousness. Feeling is thus the empirical ego which has not yet become explicit. (This paper appeared in full in the *Journal of Philos., Psych., and Sci. Methods* for January 18.)

The Definition of 'Feeling.' By H. N. GARDINER.

Examination of the various derived meanings of the term 'feeling' as commonly used shows a reference, in most cases, to an experience analogous to certain features of tactile and bodily contact sensations, namely, immediacy and intimacy of acquaintance, obscurity of content, tentativeness in the movement towards more definite consciousness and direct qualifying identification with self. A psychological use of the term should keep as closely as possible in touch with the common meaning. Hence it should not be applied exclusively to the pleasure-pain and allied phases of consciousness, however general and important. The usual definitions of feeling limiting it to such phases are insufficient. 'Feeling' may be defined as the immediate consciousness of the modification of individual experience as such; a feeling, as the content of consciousness, however constituted, regarded as the immediate modification of such experience. Primarily the self is constituted of a *felt* manifold of qualitative differences, and such a manifold, constantly changing, persists as the basis of the distinguishing functions of the mental life. (This paper appeared in full in the *Journal of Philos., Psych., and Sci. Methods* for February 1, 1906.)

Discussion of the Two Preceding Papers.

JAMES R. ANGELL. — The desirability of a definition of feeling has been especially felt by those called upon to teach psychology. It is necessary to define feeling more or less arbitrarily. Subjective refer-

ence must be the most important element in a definition. We should be cautious with Mr. Marshall's 'empirical ego' because there is even less agreement as to what it is than there is about feeling. Moreover, it is difficult to distinguish subjective reference as an occasional cognitive function from subjectivity as an existential condition, as 'matter of being,' in Ward's phrase. Nevertheless, if feeling is to have psychological status emphasis must be placed on its subjective character, and then we must proceed to explain precisely wherein this consists.

G. M. DUNCAN. — There would be a gain in accuracy and in scientific progress by discarding the term 'feeling' altogether, as it, like the terms 'consciousness,' 'perception' and 'sensation,' is unsuited for use in a scientific terminology in consequence of its many and popular connotations. If used, it seems especially undesirable to give it the wide generic sense of 'thought' and 'idea,' as those terms were employed by the Cartesians and by Locke, respectively. 'Affection,' or 'affective psychosis,' was the meaning (and term) preferred. Taking feeling in that sense, it was held that imperfect psychological analysis or philosophical preconceptions only could lead to identifying it with mere pleasure-pain. Our feelings have, *qua* feelings, quality as well as intensity, and can be arranged along an ideal scale as higher and lower. Wundt's doctrine of the tridimensional nature of feeling was criticised as lacking in satisfactory evidence; the second and third elemental characteristics not being regarded as feeling proper at all, but rather as effects or accompaniments, organic or mental, which are confounded with affective states proper. Agreement was expressed with Marshall and Angell in the emphasis laid upon the characteristic of 'subjectivity' as of the essence of feeling; feeling being 'subjectively subjective.'

G. STANLEY HALL. — Five years ago the speaker collected a great number of definitions of feeling with a view to studying the question, but laid them aside as being quite unprofitable. It is entirely delusive to attempt to define feeling. Definitions are the last product of development. The important thing is to collect illustrations of the emotions, curves of interest, physiological reflexes, etymologies, studies of dictionaries, histories, etc., and manifestations of feelings in animals. Intellect was first studied by psychologists in detail, then came will, and feeling is now on the docket. Knowledge and description of facts, and above all development histories, are the best possible definition. Words must not take the place of things. If feeling must be defined it covers the whole of mental life. Consciousness, as in strong feeling, is subordinate to feeling. Feeling is wider and older genetically than

intellect or will, and in a sense is better, *i. e.*, more immediately known. To fall back on definitions is dangerous. Confession of ignorance, that we know nothing about feeling, is best.

CHARLES H. JUDD. — Feeling is recognized as peculiarly subjective in character, and it is a common attribute of all mental states. It is often described as vague. This description is due to a wrong effort to force feeling into the categories of cognition. A state may be vague as cognition and yet be emphatic and distinct as feeling. Taking into account the subjectivity of feeling, its universality, and differentiation from cognition, we are led to recognize the intimate relation of feeling to the expressive side of mental life. Every mental state has as one of its constituents an 'attitude.' This attitude is an expression of the empirical ego; it is always present; it may have a clearness of its own even when its grounds, or cognitive justifications, are vague. If the word 'attitude' is freely used where 'feeling' occurs in psychological discussions, the significance of this view will become apparent.

MARGARET FLOY WASHBURN. — Feeling in its broad sense may be defined as the unanalyzed and unlocalized part of consciousness. We should distinguish between (1) processes that do not happen to be analyzed or localized at a given moment, because not in the focus of attention, as for example a name that one is trying to recall; (2) processes that are not under ordinary circumstances analyzed or localized, such as the mass of organic sensations making up emotion, or the 'feeling' of effort; and (3) processes that ultimately resist all analysis and localization. Under this third head belong the so-called relational elements, vestiges of primitive motor attitudes, and pleasantness-unpleasantness, corresponding to the positive and negative reactions. Pain, being localized, should be classed under the head of sensation rather than feeling. (Miss Washburn's remarks appeared in full in the *Journal of Philos., Psych., and Sci. Methods* for February 1, 1906.)

Attention and Interest. By WM. H. BURNHAM.

Attention is said to depend upon interest. It is equally true and quite as important that interest depends upon attention. The word interest, as everybody knows, is used in two senses: (1) as practically all psychologists agree, it denotes a complex state of feeling; (2) it denotes a permanent habit of preperception. Even in our standard psychologies these two meanings are often confused. If the word interest is used in the latter sense, to signify a permanent habit of pre-

perception, nobody will deny that attention depends upon interest; but this is merely saying that our present preperception depends upon our past habits of preperception. If, however, by interest is meant the affective state, there is no adequate justification for saying that attention depends upon it. Attention is a reaction of the whole organism, comparable to the tropisms of plants and animals. We must suppose an affective state correlated with this reaction. This affective state is interest. The least we can assert is this correlation; the theory here supported is that *the feeling of the organic adjustment in attention is the interest*. Stated in this way it is practically a corollary from the Lange-James theory of emotion.

While with legitimate heedlessness we may continue to use the popular phraseology in regard to attention and interest—just as we say that the sun rises and sets—in our special psychology of attention it is confusing to teach that attention depends upon interest. Not only the popular but the psychological uses of the words interest and attention are misleading survivals of an obsolete science; and in pedagogy this usage has led to great confusion and error.

Of course, any such account of the processes of attention and interest does injustice to the complexity of the actually existing mental states. The process of preperception determines not merely the aspects of an object to which we attend, but to a great extent the intensity and coloring of the affective state, that is, the interest. That this may occur in a short-circuited manner—the preperceptive images being associated with affective states, or, if one prefer, they themselves having an emotional coloring—there seems to be no reason to deny.

Excursive Attention. By J. P. HYLAN.

The tendency of recent researches which indicate the impossibility of a simultaneously divided attention calls for the recognition of the real nature of the phenomena that have been studied. This appears to consist of the habit of rapidly shifting from one object to another, and hence is made up of a series of successive acts. This wandering or shifting of direction is different from concentration on the one hand or mind-wandering on the other. Excursiveness is the term proposed for it, and excursive attention to indicate the form of attention which goes with it.

Not only the inability to divide the attention, but also the rapidity of mental fatigue, makes excursiveness a necessity. This is especially the case in perception. Evidence of this comes from a great variety of experiments and also from the explanations of optical illusions and from introspection.

While in perception excursiveness is of a reflex type and appears largely as an unconscious method in judgment and when trying to keep track of a number of things at the same time, it is more often conscious and voluntary. Almost any trade or active occupation illustrates this to a greater or less extent. It is especially prominent in administrative work and the control of large business undertakings. While the power of concentration of attention is a predominant aim in mental training, excursive attention is no less essential to the needs of practical life.

The Psychology of Organic Movements. By I. MADISON BENTLEY.

The psychologist's interest in organic movements depends, in large measure, upon the systematic point of view from which he regards consciousness. In order to avoid partisan bias and clearly to set forth the essential relations obtaining between psychology and movement, it is necessary to distinguish 'motor' *facts* from 'motor' *theories*.

The factual relationships of movement and consciousness furnish data common to all psychologies. These relationships may be indicated by an enumeration of the specific problems into which movement enters as a primary factor. The specific problems once stated may be disposed of in either of two ways; they may be referred to, and absorbed in, the general psychological system, or they may be subsumed under some single, all-inclusive 'motor' theory.

General motor theories are of two types; the first type emphasizes the motor *conditions*, the second the motor *consequences* of consciousness. Ribot's theory of attention and Münsterberg's *Aktionstheorie* are theories of the first type; while the biological trend, which appears in several varieties of 'functional' psychology, tends to encourage theories of the second type. A consideration of the psychology of 'coördination' and 'adjustment' leads to the conviction that the primary postulate of this psychology is a conscious *activity* which may be identified with attention, and that this activity, as the chief agency in the production of adaptive movements, stands in need of careful definition and description.

Modified Causation for Psychology. By G. M. STRATTON.

The admission that two mental events or a mental event and a physical event are not parts of a continuous process and are not equivalent in quantity, seems at first sight to settle the question as to a casual connection between them. But we must remember that our idea of cause, while in part *a priori*, is also in part empirical; and the empirical elements in it have been derived mainly from our observation

of physical objects. The idea of causation most serviceable in physics, however, need not be the one best fitted for the study of the larger world which includes both physical and mental events. Indeed, it would seem well to make 'concomitant variation' our chief criterion of causation here, and to back it with the other 'canons of induction,' but not to require any quantitative equivalence or any kind of qualitative continuity. Philosophy has never felt bound to regard physical causation as the sole type of causation; and psychology may feel quite as free.

Psychical Energy. By WILHELM OSTWALD.

Since the time of Descartes matter and mind have been regarded as utterly different parts of the world, extensivity being the characteristic property of matter and thinking that of mind.

Psychophysical parallelism appears to open the only possible way of bringing the mental processes into relation with the corresponding physicochemical or physiological processes in the nerves and the brain, as long as one keeps to the assumption that these physicochemical processes are nothing but mechanical processes going on among the atoms of the brain. This fundamental assumption of mechanical materialism is generally taken for granted, and notable philosophers have even endeavored to prove that it is the only possible assumption for the understanding of the physical world. Only in recent times has this assumption been criticized and turned out to be nothing but an arbitrary hypothesis.

In the present state of our knowledge the only safe and sound theory of the physical world is the energetical one. Every physical fact can be described in terms of energy without the help of any arbitrary hypothesis; it is therefore possible to state the whole empirical content of every physical fact or relation by describing the energies involved as to their kind of magnitude.

As energy is by far the larger concept as compared with matter and motion — electricity for example can not be described in terms of the latter, while it can be described in terms of energy — it seems possible to extend the concept of energy so far as to include mental facts as well as physical ones. While psychical facts cannot be considered as mechanical ones, there seems to be no contradiction in considering them as produced by certain changes of energy. We are justified already in assuming that the process going on upon excitation along a nerve is an energetical one. What kind of energy is involved we do not know; the slow rate of propagation disproves the electrical nature of this process, which was assumed in former times. It may

be a kind of energy of its own, or else a peculiar combination of two or more energies. Now between unconscious nerve- and brain-processes and conscious ones there is no sharp distinction; therefore the inference is justified that there is no essential difference between them as to their nature, *i. e.*, that conscious mental processes also are energetical ones.

To make this point clear, we will assume an ideal experiment. Suppose we know exactly the amount of all the energies a human body is built from, and record the quantity of each in every instant. If then this human being starts a mental process, part of the chemical energy of the brain would disappear as such, without appearing at the same time in another known form; it would assume the state of mental or psychical energy. When the mental process is stopped, just this quantity of energy would appear in another form, probably as heat.

Unless this experiment or an equivalent one is carried out, the theory of psychical energy remains in the state of a protothesis, *i. e.*, as a probable but still unproved inference from experimental facts. As this theory is the only one which opens a way to connect the inner and outer world by a functional relation, it has a distinct advantage over the theory of psychophysical parallelism, which is no theory at all, but only an arbitrary declaration that no such functional relation exists.

Introductory Remarks on Coöperation. By CHARLES H. JUDD.

Such suggestions as are made in this paper are based on the conviction that each laboratory must determine its own problems and methods of investigation. Within the limits thus set for coöperation there are four directions in which it is profitable for the Association to consider the possibility of more intimate relations between laboratories and departments.

1. A committee of the Association might very profitably bring together information regarding apparatus. Many laboratories are prepared to furnish certain pieces of apparatus but do not find it possible to announce this fact extensively. Many new laboratories find it very difficult to secure information regarding good apparatus.

2. The possibilities of coöperation in the publication of psychological results are by no means exhausted.

3. The interests of different psychologists could probably be better served by dividing the Association meetings into small sections of psychologists who would have more discussion of their particular papers than is possible in the general Association meetings. The desirability

of such separation of special interests is now manifesting itself in the tendency of the experimentalists, for example, to have a separate session during the spring recess.

4. It would be profitable for the Association to devote more time at its regular meetings to the discussion of methods of instruction and to the discussion of courses in the different phases of psychology.

A Sketch of a Beginner's Course in Psychology. By E. C. SANFORD.

The form of the following course is determined by three considerations: (1) The universally accepted pedagogical principle that one must begin to build upon the foundation of such knowledge and interests as the pupil already possesses; (2) that a wide basis of general acquaintance with psychological facts is essential to satisfactory progress; and (3) that a genuine interest in science for its own sake is a late development in knowledge of any kind. The course should then begin with what is not far removed from the habits of thought and the practical interests of the pupil, and progress, with abundant contact with concrete psychical facts, to those things that are of interest as matters of pure science. Such a course might take up the following topics in something like the following order:

1. Psychology of Learning and Acquisition: Memory (including mnemonics) with its helps and hindrances; habit; practice, acquisition of manual skill and dexterity, learning of languages, and of complex mental operations. (Attention, emotion, volition, fatigue, interest, etc., to be treated incidentally as necessary.)

2. Psychology of Truth and Error: Illusions; prejudice; superstition; delusion; Bacon's idola; mob psychology; psychology of testimony, of logical reasoning and the fallacies. Evolution of general ideas, and origin and nature of belief.

3. Psychology of Emotion: Nature and laws of strong racial emotions—fear, anger, and love; their biological purpose and their hygiene. Psychological basis of æsthetics; the intellectual emotions. Psychological basis of ethics.

4. Psychology of Personality and Character: Types of character; temperament; the criminal, pauper, mystic, philistine, the natural leader and born henchman. The formation and influence of ideals. Psychology of the will; hygiene and diseases of the will.

5. Facts of the Interdependence of Mind and Body: The permanent and the alterable in the human make-up, heredity and acquired characters; the nature and evolution of instincts, the nervous system (anatomical and physiological) as the basis of these. Hypnotism.

Chief forms of nervous and mental disease. Neural and mental hygiene.

6. Psychogenesis: Biological view of mind and the history of mind in the animal series. Human psychogenesis.

7. Brief review and systematization of the facts already presented: Systematic psychology.

It is to be understood throughout that all these topics are to be presented as concretely as possible, with demonstrations, class and individual experiments, introspections, guided and free, and whatever other means may be possible.

In defense of such a program it may be said, first, that as every mental process involves psychical factors of all kinds there is really no *natural* order of presentation for the subject, and that in teaching the pedagogical requirements should be determining; and, second, that the average beginner in psychology knows enough of the meaning of words to make such a mixed order of treatment possible. The purely logical order often followed has advantages, but they are over-balanced in the writer's opinion by the tendency to too great abstraction in the beginning and by the necessary assumption of a theoretical and genuinely scientific interest—something rarely present first and usually to be reached only at the end of a good course.

Discussion of the two preceding papers.

E. A. KIRKPATRICK. — Regarding coöperation the speaker suggested that the Council, when considering what shall be done with the accumulated funds of the Association, should deliberate upon the advisability of employing a paid secretary who, in addition to the usual duties of a secretary, should undertake to organize a bureau of information and exchange. In regard to the teaching of psychology, he said that while none of us teach or justify the teaching of the dogmatic psychology condemned by Miss Calkins, yet the result of our teaching upon the minds of beginning students is often the same as if it were dogmatic. Unknown to ourselves we are likely to thrust upon their minds the mass of facts and general truths reached by psychologists and expressed in technical terms, before the power to observe mental processes and to think clearly about them has been developed. Even the best students who have already done a good deal of observing in what they call the study of 'human nature' often fail to recognize familiar truths when arranged and named in the psychological classification and terminology. We have had the ideal course described by Dr. Sanford this year. Let us next year have a conference and re-

port what we have actually done in teaching beginners psychology during the year and the results.

HERBERT G. LORD. — The speaker contended that, in both the subject matter and method of teaching the elements of psychology, the tendency was to be unconscious of the ignorance and mental confusion of the beginner. The instructor's very familiarity with the subject was his misfortune. He knew too much and talked over the heads of most of his students. The ideal text-book could be written and taught by a man whose youth was not dead and buried. This condition of mind of the beginner rendered the lecture method of instruction the very worst conceivable.

WALTER T. MARVIN. — The speaker agreed with Professor Sanford's paper as presenting an ideal, especially in the way of subject matter, though one hardly realizable. The chief problem in any course is: What precisely does the teacher wish the student to learn, as distinguished from all the illustration, exposition, etc., that may be found helpful? In short, every course should include a body of definite and precise information to be thoroughly learned, hard as it may be to secure such information in psychology as compared with the exact sciences.

We cannot educate general functions, but perhaps one of the special habits we can form in the brightest pupils is reading interesting books on psychology. This might be possible, especially under the preceptorial system at Princeton or some similar system.

C. E. SEASHORE. — The speaker called attention to the fact that one may see three distinct theories in regard to the place of experiment in elementary courses embodied in the construction of laboratories at the present time. In making provision for the first-year students some laboratories provide large lecture rooms seating two or three hundred students, others provide moderate-sized lecture rooms seating from thirty to fifty, and still others provide small rooms or booths for the accommodation of the individual experimenter. The first and the third are undesirable: the failure of the large class lecture is notorious, and first year students cannot profitably pursue the individual experiment. Experimental demonstrations should be used very freely with the beginning students in moderate sections such that each student can follow the experiment, question, or be questioned. A three-hour course throughout the first year may well be devoted to the teaching of facts, richly illustrated and applied; the individual laboratory course may be reserved for those who desire technical training, which will not be more than one tenth of the beginning class.

S. I. FRANZ. — The speaker remarked that in his opinion under present conditions there could be little coöperation between the laboratories in universities and in insane hospitals. If, however, more psychologists appreciated the importance of and showed interest in the mentally abnormal, more helpful relations would be brought about. The hospitals are primarily for the care and treatment of patients and secondarily for research and education. The hospitals cannot well take up the teaching function, but many institutions are willing to grant to well-trained workers opportunities for investigating the mental condition of the insane and the feeble-minded. The opinion was expressed that much of value to normal psychology could be obtained if more attention was devoted to these mental conditions, which are principally exaggerations and diminutions of normal functions. Casual visits to insane hospitals, however, do not give an adequate idea of the material or its value. A period of time corresponding to a university semester could be profitably spent by students of psychology in the study of the insane or feeble-minded. Such a period of time would be sufficient for the psychological investigator to obtain an insight into the problems and the material, and the hospital would be repaid by the research which could be accomplished.

R. S. WOODWORTH. — Coöperation is perhaps most needed in the way of mutual criticism. Published results in psychology often remain for years neither generally accepted nor rejected, because they are not critically threshed out nor experimentally tested by other psychologists. Our standard of productive work would be raised by giving serious and critical attention to each other's results.

In the usual introductory course of psychology, the student is referred mostly to his own experience for data. He is not taught new facts so much as a new point of view. It is at least worth considering whether a course could not be arranged which should — as in the other sciences — present him with facts entirely new to him. The great difficulty with such a course would be the selection of really valuable facts; the more recent literature is richer in such facts than the older literature on which most text-books are based. It would also be difficult to make the course systematic. It should, without doubt, be an experimental course with laboratory work.

EDWARD COWLES. — Mental physiology is essential to mental pathology, and psychology would be greatly aided by the study of functional modifications under pathological conditions. The insanities can be studied to advantage only in hospitals for the insane; the possibility of coöperation between these institutions and the teaching of

psychology depends much upon what is wanted. The general demonstrations of a hospital clinic to a class can be given usefully and as practicably to psychological students as to medical students; comparatively few of the latter get more than that under the present conditions of teaching psychiatry. It would depend upon such a clinic being available near enough to a college. The difficulties include the want of time and interest of busy institution officers in the specially psychological aspects of the cases. As far as research in psychological problems is concerned little can be accomplished except in a hospital where a laboratory for psychological experiment is provided, and actual clinical work is being conducted by a competent investigator. Under such circumstances a student having the privileges of a period of residence, or of daily observation, might profitably undertake the work of special research. Such circumstances are so exceedingly rare that I know of only one place in this country, and of that Dr. Franz has just spoken. The hope is that the value of such laboratory work in its immediate service to the patients will become appreciated. This is already apparent enough as a matter of fact; and it is hopeful that hospital authorities can find a reason for granting such privileges in the fact that it is a benefit to the institution to have such contributions of research work to its own service.

ADOLF MEYER. — The speaker regretted that courses in psychopathology, in their coöperation with hospitals for the insane, unfortunately follow as a rule the scheme of filling the students with a collection of the most clean-cut pictures from the literature, and then use a demonstration of actual cases in hospitals merely as an illustration. This scholastic method does more harm than good, and it is urgently desirable that students should become more familiar with the actually accessible facts of observation and less intoxicated with abstract presentation of the attractive unusual. Courses in psychology as usually given form a very inadequate preparation for work in psychopathology. Dr. Sanford's plan would more adequately meet the needs than the very dogmatic laboratory psychology which spends such an excessive amount of time on the study of sensations that it is forced to exclude the study of the development of instincts, which would form a much more adequate avenue to the study of psychopathology.

(Remarks were also made by E. B. Delabarre, E. A. McC. Gamble, Robert MacDougall, E. L. Thorndike, the president and others.)

The Doctrine of Specific Energies. By C. LADD FRANKLIN.

(Read by title.)

The Possibility of Retinal Local Signs of the Third Dimension.

By W. P. MONTAGUE. (Read by title.)

The Color Sense of Young Children. By W. S. MONROE.

Four hundred children between the ages of three and six years were tested with the spectrum colors along the four lines: (1) ability to match colors; (2) ability to name colors; (3) color liked best; and (4) favorite color combinations. Sex differences were not pronounced, although the girls matched and named colors slightly better than the boys. Ability to match and name colors increased with years. Red was at all ages and with both sexes oftenest matched and named correctly, and blue ranked second. Orange and violet were least often perceived and named correctly. Red was the favorite color, blue second, violet third. Red was most often used in color combinations and blue came second. Green was most frequently matched, named and used in color combinations by the children of Irish parentage. Ability to name colors correctly lags much behind the ability to match colors correctly. Standard colors are generally preferred to shades and tints. Black and white are probably known much better and much earlier than the spectrum colors. There are marked individual differences in the ability of young children to name and perceive the spectrum colors.

Primitive Color Names and the Primary Colors. By J. W. BAIRD.

Philologists have found that many of the languages of antiquity are characterized by a poverty and indefiniteness of color-vocabulary. They have found too that in numerous instances names for red and yellow were evolved at an earlier period than names for green and blue. Anthropologists report that certain primitive races of the present day possess a normal (European) sensitivity to red and yellow but a subnormal sensitivity to green and blue. Certain observations upon children are said to have yielded a similar result. And archeologists have discovered that the sculptors of antiquity made ludicrous blunders in their use of blue pigments, while red and yellow pigments were applied appropriately.

From this mass of evidence two general conclusions have been drawn: (a) The color sense is of comparatively recent acquisition. It was wholly lacking in our early human ancestors; even so late as the Homeric age man was totally color-blind; (b) The evolution of the color sense has followed the spectral order— from red through yellow and green to blue.

There is reason to believe that both these conclusions are erroneous. (1) The philological argument is based upon the untenable assumption that the development of color names has always and everywhere kept pace with the development of color sensitivity. (2) It seems incredible that a function so highly differentiated as the color sense could have been evolved in the course of a hundred generations (Homer to the present). (3) Moreover, the fact that many of the lower animals seem to be able to distinguish colors makes it seem improbable that any race of mankind, however primitive, was totally color-blind. (4) The archeological argument loses its force unless one grant that artists have always aimed to make facsimile copies of their originals. Moreover, archeological remains (Persian and Egyptian) show that green and blue pigments were correctly employed at a pre-Greek period.

It seems probable that the colors of the red end of the spectrum were named at an earlier period than those of the blue end, but this does not necessarily imply that our color sensitivity has followed the spectral order in its development. (5) The fact that blue pigments were relatively inaccessible to primitive man undoubtedly had its influence upon the evolution of a color terminology. (6) The relatively late appearance of names for green and blue may be referred to a lack of interest in these colors — a lack which is common to primitive races and children. (7) The fact that dark-skinned races are relatively insensitive to (green and to) blue may be explained in terms of a deeper macular pigmentation (*cf.* tests of indirect vision, Virchow, Rivers) and not at all in terms of an absence from the retina of blue-sensing substance. Indeed, certain very primitive peoples are not less sensitive to blue than to red (Woodworth).

The phenomena of indirect vision clearly indicate that the color senses were evolved in pairs, and in the following order: first black and white, subsequently yellow and blue, and finally red and green. This view is supported by the circumstances (*a*) that the zones of color sensitivity have a paired arrangement upon the retina, (*b*) that the black-white substance has the widest, and the red-green substance the least wide retinal distribution, and (*c*) that the red-green substance is most readily fatigued while the black-white substance possesses the greatest tenacity of function. Our view is also supported by the fact (*d*) that in case of atavism of the color sense (color-blindness) the red-green function is the first to be lost. It is further confirmed by (*e*) the order of disappearance of the color zones in hysteria and in progressive atrophy of the optic nerve.

A Study of After-images on the Peripheral Retina. By HELEN B. THOMPSON and KATE GORDON. (Read by Miss Gordon.)

Experiments were made upon the peripheral retina of the light-adapted eye. Nine pigment colors served as stimuli. The after-images of these colors were cast upon backgrounds of varying brightness. It was found that: (a) The color-tone of an after-image is modified by the brightness of the background upon which it is thrown. Upon a dark ground the darker color-element is emphasized, and upon a light ground the lighter color-element. Thus a carmine after-image looks bluish-carmine on a dark-gray ground, but reddish-carmine on a light-gray ground. (b) A dark ground tends to bring out the stimulus color, but to suppress the after-image; whereas a light ground tends to suppress the stimulus color, but to bring out the after-image. It is possible for a subliminal color stimulus to produce a supraliminal after-image of appropriate color-tone; a carmine seen as gray produces at times a distinct green after-image, and a green seen as gray a carmine after-image. (c) Finer discriminations were made in the red-yellow end of the spectrum than in the blue-green end, both in stimulus and in after-image, for, (1) on the part of the retina where the stimuli red, orange and yellow were distinguished from one another their after-images were not differentiated, *i. e.*, each of these three colors produced pure blue after-images, and (2) on a part of the retina where the stimuli green-blue, blue and violet were not distinguished from one another, but all appeared blue, the after-images to these colors were differentiated, being respectively orange-red, orange and greenish-yellow.

Visual Adaptation in Tachistoscopic Experimentation. By JOHN A. BERGSTRÖM. (Read by title.)

The apparatus employed in these experiments is a new type of tachistoscope, essentially like one figured and described by the writer in the *Indiana University Book*, pp. 94-95, 1904. In experiments with the apparatus, the preparatory adaptation, or the lack of it, may be of several kinds, most of which permit quantitative variation. An experiment consisted of ascertaining what variation would be produced in the apprehension and reproduction of a series of eight or nine letters under any one of a number of specified experimental conditions.

Discrimination of letters is not a very sensitive measure of the degree of adaptation; they can, of course, be read in light of very different degrees of intensity, so that considerable changes in brightness might occur and be noticed without corresponding changes in the record appearing. In general, adaptation by means of the translucent

screen with a brightness somewhat below that of the flash (10σ) seemed best and gave the best records. While there would be some error from unfavorable conditions of adaption in tachistoscopic experimentation, my impression is that so much can be effected by training that the error from this source would not be so great as some critics of such work seem to assume from observation of the effects of adaptation in everyday experience or in the usual laboratory experiments.

Photographic Studies of Convergence. By C. H. JUDD.

The investigations reported in this paper were made by the photographic method described in the *Yale Psychological Studies*, Vol. I, pp. 1-20. The eyes of two observers were photographed during movements of convergence and divergence. In no case studied did the two eyes make movements of convergence at the same rate. One eye regularly moved more rapidly than the other, the differences in time being on the average the difference between 260 sigmas for the rapid movement and 400 sigmas for the slower. In divergence the difference in the rate of movement in the two eyes was not so marked. Very often the eye which converged more slowly made a sympathetic lateral movement corresponding in direction to the movement of the eye which moved rapidly. This tendency to sympathize was very marked when the line along which the fixated points were placed coincided with the line of fixation of one of the eyes.

These facts show that even in fully developed adult convergence the movement is not wholly automatic and independent of the retinal images which arise during movement.

On the Influence of Reflex Stimulations to Eye-movement upon Judgments of Number. By ROBERT MACDOUGALL.

This investigation sought to trace in our numerical judgments the influence of the varying system of stimuli to reflex eye-movements which the visual field presents, in a way analogous to the effect which these stimuli exert upon our judgments of distance and quantity.

The materials consisted of twenty to thirty scraps of black and colored paper scattered over a constant area, judgment was given in terms of a comparative estimate of two groups simultaneously presented, one of which was arranged with a view to produce a greater reflex stimulus than the other. A series of such comparisons was made, involving brilliancy of coloring, contrast with background, focalization and oscillation of vision by *points de repère*, comparison of horizontal and vertical eye-movements, etc.

The observer's estimation of the number of objects presented

seemed throughout to be affected by such arrangements, but no quantitative comparison of the influence of the various factors introduced was feasible under the methods adopted.

Vision during Dizziness. By EDWIN B. HOLT.

The stimulation of the semi-circular canals produced by rotation of the head and body, results in a nystagmus of the eyes. The direction of these eye movements depends on the position of the head during the rotation, *i. e.*, the canal that is most effectively stimulated. In every case this direction lies in a plane normal to the axis of rotation. The nystagmatic movements (back and forth) are always such that the movement is slow in one direction, more rapid in the other. The rapid movements can be voluntarily inhibited, the slow cannot; that is, the eyes can be held still on the side toward which the slow movements bring them, but not on the other side. Both eyes move together and similarly. (These movements are illustrated by photographs of the eyes during the dizziness produced by rotation with the head held vertical. Speed and the extent of the two kinds of movement measured.)

Now the rapid movements allow no visual sensations to reach consciousness, while the slow do so allow them — as is shown by the after-image streaks observable by the subject, from a luminous point that moves (during the dizziness) at right angles to the direction of the dizzy eye-movements, and on a black field. This explains why in dizziness the visual field swims in one direction only, and not in the other, *i. e.*, why the field does not seem to swim to and fro. This fact is further verified by the behavior in consciousness of a lasting after-image generated on the eyes before rotation, and observed by the subject as to its appearance during and after this rotation. I find no mention of these facts in the literature, save for a paragraph of Delage and a parenthetical reference by Mach. Both authors have given merely their passing attention to the matter.

The nystagmatic movements are entirely consistent with Breuer's theory of the function of the semi-circular canals (which is likewise that of Mach). The rapid movements have several resemblances with those of Professor Dodge's first type; the slow ones, though belonging in that author's fourth type, yet have some features in common with those of the second type. The rapid movements, owing to 'important central factors,' occasion or occur concomitantly with a central anæsthesia.

Vision and Localization during Eye Movements. By R. S. WOODWORTH.

Vision with the rapidly moving eye (*i. e.*, during movements of Dodge's 'simple reaction type,' which I shall call 'eye jumps' for short) does not differ essentially from vision with the resting eye, or with the eye which is making a 'pursuit movement' — given only the same retinal stimulation in the three cases. The evidence for this statement is as follows:

1. In reference to the mirror experiment of Dodge, in which the eye tries to see its own motion, the result is inconclusive, because the moving eye could only be seen in indirect vision anyway, and because what would be expected from the conditions of retinal stimulation in this case is not clear vision of a moving eye, but a blurred image.

2. When the field of regard during an eye-jump encounters an object moving in the same direction and at the same speed, the object is clearly seen, as would be expected from the conditions of retinal stimulation. That this appearance is not an after-image coming to consciousness at the close of the movement is proved by the fact that it is correctly localized in space, and not projected on the background at the new fixation point, as an after-image would be. Also, the reaction time to an object so seen is not long enough to include any considerable period (.1 sec.) of anesthesia or central inhibition.

3. When a dark field presents one luminous spot, the spot is seen to jump counter to the jump of the eye, leaving behind a bright streak (the 'false streak' of Holt); after the lapse of the usual latent period, a fainter after-image streak is also seen. All this is exactly as would be expected from the conditions of retinal stimulation, and can be duplicated by moving the field past the fixed eye (most conveniently by aid of a mirror). The 'false localization' of the bright streak is simply a recognition of the direction of movement along the retina. The fact that the apparent extent of the spot's movement (length of the 'false streak') is less than the distance between the old and the new fixation points may be interpreted as analogous to the general inaccuracy of comparison of (angular) retinal magnitudes with the magnitudes of known objects in space. There are several details in the 'falsely localized after-image' experiment which cannot be explained by Holt's hypothesis; *e. g.*, when a bright spot is presented only during the middle of the eye jump, still both streaks are seen, and the apparent motion of the spot is in evidence; yet this is the period of the supposed anesthesia which cuts short the 'false streak.'

4. When the field presents no great contrasts of brightness, as in ordinary conditions, its appearance during an eye jump can once more be duplicated by moving the field while fixing the eye. An object

presented only during the movement of the field often escapes observation entirely. After practice, fusion, flicker, and apparent backward movement can all be seen during eye jumps. Entoptic specks and after-images can also be seen.

A Simple Method of Measuring Relationships. By E. L. THORNDIKE. (Read by title.)

Growth of Vocabularies. By E. A. KIRKPATRICK.

A preliminary report of an incomplete study of the size of vocabularies of pupils from the second grade to the university. The method used was that of having a hundred words (taken by chance from the dictionary) marked as known, unknown or doubtful. The results so far as tabulated indicate that the understanding vocabulary of any person may thus be estimated with a fair degree of accuracy and that those who read much possess larger vocabularies than those who do not. It also appears probable that such a test associated with a definition of some of the words may be a ready and fairly accurate means of estimating the general intelligence of pupils.

Training in Singing by aid of the Voice Tonoscope. By C. E. SEASHORE.

The speaker described certain recent improvements in the tonoscope, namely, the driving and control of speed by means of a synchronous motor, using a metal drum with siren holes, producing the standard tone directly from the drum and producing a tone of any vibration frequency within an octave by means of a selenium cell. He then stated some results of a series of experiments made by a student, Mr. E. A. Jenner, showing that training for accuracy in control of the pitch of the voice in singing (1) progresses much more rapidly, and (2) may reach a higher degree of efficiency in training by the aid of the tonoscope than in training without it. The tonoscope reveals to the singer the nature and the amount of the error of a tone to a very much finer degree than the ear can hear. Incidentally a measure of the relative difficulty of the intervals, the major third, the fifth and the octave, was obtained and it was demonstrated that, for the purpose of reproduction, these steps are approximately equal. It was also demonstrated that the least producible change in the pitch of the voice, in different parts of an octave within the middle range, is a constant fraction of a tone.

Linguistic Lapses. By FREDERIC LYMAN WELLS.

Linguistic lapses are always involuntary, central, not necessarily conscious, and referable to a physiological basis. Their five general

types are the assimilation, the dissimilation, the omission, the substitution, and the metathesis. The first, fourth, and fifth of these are generally dependent upon associative processes. The similarity of the motor and sensory lapses is only superficial. The study of lapses substantiates the view of individual localization for individual motor linguistic elements. In the sensory lapse the mnemonic factor is paramount. Metatheses are due to the weak memory for the time of events compared to that of the events themselves. The most favorable condition for both progressive and regressive sensory assimilation is a poorly perceived stimulus followed by a well perceived one. There is unconscious predisposition to certain classes of sensation in all subjects.

Comparison of the Maximum Rates of Actual and of Imagined Voluntary Rhythmic Muscular Movement. By CHARLES T. BURNETT.

The movements in question were made with the finger, the hand, the forearm, the arm, and the leg, the latter rotating at the hip. The rhythmic movements consisted of a series of back-and-forth movements through a fixed arc. The type of imagination at first employed was kinesthetic. The experiments, which were carried out with a single subject, the experimenter, and which must therefore be regarded as tentative, show that the maximum rate of imagined rhythmic movement is in most cases far smaller, and in all cases definitely smaller, than the maximum rate of the corresponding actual movement. Increase in rate occurred with practice, and in all but one limb to a greater extent with the imagined than with the actual.

The average variation for actual movements is greater than for imagined, and the variation among themselves of the several kinds of actual movement is ten times as great as of the several kinds of imagined movement. It appears, therefore, that the maximum rate of imagined movement is not determined by differences in the limbs, when the imagination is of the kinesthetic type; and that, further, the motor cue cannot be furnished by such imagination. Similar experiments carried out with the visual type of imagination show marked increase in rate, but are not yet as great as the highest rates for actual movement.

In the search for a field where the maximum rate of imagined movement should be equal to that of actual movement, eye and breathing movements were tried with the same result. The speed of auditory imagination was also tested with series made up in one case of the syllables tut-tut-tut- etc., and in another of the alternating sounds

of inhalation and exhalation; but this showed in its turn a failure to give a rate as rapid as that of the actual limb movements. The same was true of a series of touches imagined as stimulating in alternation the volar and the dorsal sides of the finger. The conclusion seems justified that in the limited field of movement under consideration the classical theory of volition does not hold.

Experiments in which the arc of imagined movement was a maximum indicated that this factor has an important effect in showing the maximum, etc.

A New Kymograph. By J. P. HYLAN.

This kymograph is designed to solve the difficulty of those who need a first-class machine but have not the funds to secure one of the Ludwig type. It consists of parts which are found ready-made in the market and can be put together by one of ordinary mechanical ability. The drum is $9 \times 6\frac{1}{4}$ inches and can be placed in a vertical or horizontal position. It is turned by an electric motor whose rate is reduced by worm gears and spur gears. By varying the combinations of these and also the resistance in the electric current a great variety of rates can be secured. A spiral record can be taken on the drum by means of a carriage which moves the marking apparatus automatically.

Investigations on Rhythm, Time and Tempo. By J. E. W. WALLIN.

I. *Qualitative Limens or Grades of Rhythm: the Psychophysics of Variation.*

This is a residual problem from the author's earlier research (*Rhythm of Speech*, 1902, p. 69). How much may a rhythmical interval be varied without affecting the rhythm? What is the form of the rhythm curve; how can it be psychophysically formulated?

The tone from a resonator passed through deep and less deep holes in a regularly revolving disc, the sounds being heard through a tube by the subject in a distant room at a rate of (a) 1.075 sec. and (b) 0.57 sec., both as trochees and as iambs, both in a continuous series of eighteen beats and in a discontinuous series with every six beats alternately silent and alternately sounding. The last weak beat in each round of the disc was varied progressively by minimal steps, and the subjects (ten) reported on the effect of this variation upon the quality of the rhythm.

The most important results are: (1) The quality of rhythm may be graded according to the degree of regularity into about five groups. The corresponding qualities may be designated as perfect rhythm,

good (shaky), fairly good, bad, and destroyed. (2) We may speak of these grades as rhythm limens, the number of limens for a rhythm corresponding to the number of steps between a perfect and disrupted rhythm. These difference limens are not sharp lines but rather broad thresholds. (3) The ranges between the limens are shorter. These interlimen spans are not gaps in the rhythm curve. We may think of them as corresponding to the spaces between the successive sensation steps in the Weber-Fechner logarithmic curve of sensation. (4) The rhythm limens follow the Weber-Fechner psychophysical law. The qualitative grades vary as the stimulus irregularity changes by a proportion of $\frac{1}{3}$ of itself. This, then, furnishes the first application of the psychophysical law to the field of æsthetics.

II. *The Difference Limen in the Perception of Time.*

This was ascertained in connection with the preceding experiment.

(1) It was invariably finer than the first rhythm limen (grade I.), due partly to the fact that the rhythm limen is a range while the time limen is a line; it stops short the moment the difference is perceived. But a difference in time is perceived before a change in the grade of the rhythm. (2) The limen is relatively finer for the longer interval, for the continuous method and for the trochee pattern (— ∪). (3) Its average size is 5.2 per cent. of the intervals.

III. *The Preferred Tempo.*

A. *The preferred tempo in a method of paired comparison of metronome clicks.* Twenty subjects listened to pairs of rates which always started with the extremes in the series (208 and 40). The preferred rate was repeated as long as it was preferred and compared with the next faster or slower as the case might be. The rates approached closer and closer with each successive trial, either toward the center of the pendulum or toward one of the ends. Thirty rates were compared and detailed introspection recorded on a number of points. Among the results may be mentioned: (1) The preferred tempos for all subjects averaged .519 sec., or about half a second. The median is somewhat higher, .579 sec. (2) The preferences for the different subjects can be arranged in four groups, slow, medium, fast and rapid; 1.169, .618, .435 and .319 sec. Half the results fall within the second group, the tempo of which approximates some of the earlier results. (3) The rate of the tempo preferred is independent of whether or not the subject is musical. It will depend upon numerous factors differing with the individual. (4) Nearly all subjectively rhythmized the clicks; but the rhythm was felt to be a pale affair as compared with the rhythm of music, notably the rhythm of the drum. The problem should be studied with rhythm at its best.

B. *The preferred tempo as measured by a method of expression.* For this purpose the motor responses of the gallery furnish the best material. To what rhythmical rates in the vocal and instrumental music and dancing in the theatre do the unsophisticated youths respond by stamping their feet most heartily and spontaneously? The strength of these responses can be grouped by the ear into four or five classes, and the average time for the tempo in each group calculated. (Partly finished.)

IV. *The Maximum Number of Categories of Tempos.*

The investigation is confined to the range set by the metronome. Into how many classes, groups or categories can this series of speeds be divided? What is the range of each category? (In progress.)

An Experimental Study in the Psychology of Voting. By COLIN A. SCOTT. (Read by title.)

Sex Differentiation in the Sense of Time. By ROBERT MAC-DOUGALL. (Read by title.)

Some Psychological Aspects of Success. By BROTHER CHRYSOSTOM. (Read by title.)

The paper was suggested by current strictures on the average college student of our day, and by Wilbur F. Craft's 'Successful Men of To-Day and What They Say of Success.' The deductions of the latter work are based on replies to a questionnaire. From these returns it appears (1) that a country farm is the best birthplace, as it favors a more extended exercise of the senses, and a better training in powers of observation (Professor Cattell's higher city birth-rate for scientific men being probably accounted for by the fact that their early education was given according to strictly scientific principles); (2) that the plastic period of education should be largely directed to acquiring a power of sustained observation and fixed attention, a condition often brought about by the necessity of working for one's living; (3) that the forming of a noble ideal of conduct and character is necessary both to strengthen the will and to offset the effects of unfavorable environment; (4) that therefore a systematic course of reflective reading is to be commended as helping to a conviction of one's ability to succeed, while cursory skimming over the average newspaper is to be deprecated as dissipating organized thought and concentration of mind; (5) that the selection of maxims or watchwords summing up the results of experience and reflection, if followed by frequent advertence to them during the day, tends to freshen mental vigor and increase personal courage; (6) that among the most valuable assets in the en-

deavor to attain success is the art of profiting by one's failures, an art to be acquired rather by intensity of application than by distribution of energy. In a word, singleness of purpose is a prime requisite for useful observation, which in turn generates interest, a condition of concentration of mind.

Early American Psychology. By I. WOODBRIDGE RILEY. (Read by title.)

Early American psychology was developed chiefly among the materialists in the middle and southern colonies. Foremost was Cadwallader Colden (*First Principles of Action in Matter* [1751], an unpublished treatise entitled *Principles of Morality* [date?], *Introduction to the Study of Physics* [1756?], *Enquiry into the Principles of Vital Motion* [1766], and *Reflections* [1770?]). As a materialist, Colden reduced psychology to a physiology of the nerves and was precursory to the coming French sensationalism. Thus Thomas Jefferson wrote to Cabanis in 1803 that thought is a faculty of our material organization. In the end, however, he preferred the intuitional realism of his friend Dugald Stewart and argued at length in defence of the instinctive impulses of the common-sense school.

Most significant of the native materialistic works was Joseph Buchanan's *Philosophy of Human Nature* (Richmond, Ky., 1812). In his attack on the faculty school Buchanan resembles another southern physician, Thomas Cooper, whose translation of Broussais on *Insanity and Irritation* had as appendix a *Defence of Materialism* and an *Outline of the Association of Ideas* (Charleston, S. C., 1831). Belonging not to the ideologists but to the physiologists, Cooper reduces ideas, of whatever kind, to motions excited in the brain and there felt or perceived—judgment, reasoning, reflection being not distinct entities but particular states or functions of the cerebral mass. The crass objectivism of this early no-soul psychology led to the transcendental reaction toward subjectivism and the belief in the Emersonian over-soul.