as largely typical of the high Rocky Mountain regions, temperatures have been unusually low. From about December 1, 1928, to March 1, 1929, the greater part of the time was at subzero temperatures. During December and January the temperature was mostly at subzero levels, often for as long as two weeks at a time. Milder temperatures (up to 30° to 40° above zero) were relatively infrequent and only occurrent in the daytime. The coldest period (47° below zero) occurred in February. However, it has been possible to collect living *Protozoa* and *Algae* under these conditions. About a half mile south of the college campus is a swampy area of several acres in extent that is fed with water that flows from underground. The source of this water is not definitely known, but perhaps it comes from warm areas below strata that lie buried from several hundred to several thousand feet under the high mountains to the north. A swiftly flowing stream about four or five feet wide and about one foot deep drains this swamp. At no time does this water freeze, not even when the temperature of the air is as low as 47° below zero. A curious circumstance is that such floating forms as duckweed can be found in the fully normal condition. Higher water plants are abundant. *Algae* such as *Chlamydomonas* and various filamentous forms may be collected at any time. *Amebae* of several types are to be found creeping about in material taken from the bottom. By far the most common form of *Protozoa* is *Vorticella*. *Euglena* is also rather common. No specimens of *Paramecium* have been noted in this material, but a few ciliates resembling *Colpoda* are to be seen.

Perhaps this condition is not so unusual as may appear at first sight. If other biologists who live in a "frigid" winter climate look about them, many such sources of living material for winter study may possibly be found.

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QUOTATIONS

DORMITORY OF THE NEW YORK MEDICAL CENTER

WHEN the Medical Center was dedicated last October, Dr. Samuel Lambert stated that, while the buildings met the complex requirements of an art and a science, there was one thing lacking. That was provision for the home life of the students of medicine and instructors, especially the young workers in the laboratories. Such a provision would be an innovation but it would help to foster a professional spirit and to round out professional life if dormitories and a common dining hall could be added to the buildings already developed or planned for in that monumental center. He spoke with seeming prescience, though doubtless not knowing at the moment how the need would be met. It has found response in the splendid gift of Mr. Edward S. Harkness, who, with his mother, made initially possible the Medical Center itself. This gift of $2,000,000 will now supply "the one thing lacking."

No one need fear, as Dr. Lambert said, that such an addition will lead to anything approaching cloistered life. Contacts with the outside public are inevitable both for teachers and students. They are simply assured a "quiet, commodious and comfortable home," with light and air and an outlook over the Hudson River, in close proximity to the Medical School and the associated hospitals. Heretofore, as President Butler said in acknowledging this latest munificence of Mr. Harkness, the residence conditions of medical students have been little short of scandalous. The conditions made possible by this gift will by contrast be ideal.

The indebtedness of Columbia University to Mr. Harkness is profound, but the whole community shares in it, and not this community alone; for the Medical Center is also to be more and more a world center of medical training, care and research. What Mr. Harkness has done in varied ways, not only for his own day and generation but also to help this generation make a greater contribution to the next, may be computed in dollars given, but it is beyond all computation in the saving and enriching of human life. New York has reason to congratulate itself upon the public-spirited, conscientious and intelligent way in which most of those who have come into great fortunes are contributing to the general good. So generous is their concern for the health, safety, comfort and education of the many that it can but be hoped that the miracle of the cruse of oil and the meal in the barrel will be continued to them.—*The New York Times.*

SCIENTIFIC BOOKS

The Ways of Behaviorism. By JOHN B. WATSON. Harper Bros., 1928.

Psychological Care of Infant and Child. By JOHN B. WATSON. W. W. Norton Co. 1928.

The Battle of Behaviorism. By JOHN B. WATSON and WM. MCDOUGALL. W. W. Norton Co. 1929.

I SHALL use the present occasion not to present in summary the contentious content and tone of the recent writings of Dr. John B. Watson—which may be assumed to be familiar—but to discuss the "ways

of behaviorism" as a logical position and a propaganda for popular recognition—all in its bearing upon certain issues in scientific procedure.

The situation is unprecedented and perhaps could not occur in any other science than psychology, or in any other land than America. Psychology has had a long and hard struggle to achieve scientific recognition. The movement began with the foundation of the psychological laboratory now celebrating its jubilee year appropriately by convening the International Congress of Psychology for the first time on American soil. It remains true that the methods and results of the laboratory constitute the major warrant for the unreserved acceptance of psychology in the fraternity of the sciences. The difficulties surmounted in that achievement were formidable. The intellectualist attitude, derived from long association with the discipline of philosophy academically formulated, was but slowly outgrown. The dangers of a program too rigidly conceived as the experimental version of the older types of problems were real, but avoided. In that consummation the broad interests and versatile originality of William James had no small share.

Quite as influential as the experimental reformation was the biological restatement of the entire range of human traits and their origin and significance. Without Darwin that would have been impossible. Galton was a pioneer in the field. Its most direct expression resulted in the complete restatement of the problems of animal intelligence. Thorndike's contributions led the way on the part of American psychology; Watson was a notable follower; Yerkes has carried the pursuit to its richest results. The similar reconstruction—almost a complete foundation *ab ovo*—of child psychology is of equal importance in bringing about the present acceptance of psychology as a scientific discipline. Stanley Hall was the leader of the movement; the work of Terman in one direction, that of Gesell in another, may stand as representative of the present-day fruitage of scientific method in this domain.

Clinical psychology is an equally important partner in the scientific renaissance of psychology. For the present reference it is more germane to call it so than by the more general name of abnormal psychology,[1] which better indicates its domain, to emphasize the source of the advance in the clinical attitude in the study of psychic variation. As such it is an application—one of many—of the reconstruction of psychology to vital problems of adjustment. Industrial psychology is another; educational psychology still another; criminal psychology yet another.

The inclusion of the racial and the social problems of human variation in endowment and achievement, companionating psychology and anthropology, is of comparable importance. An additional concluding reference may be reserved for the specific rapprochement of the biologist and the psychologist, notably in the study of heredity and environment in their bearing on mental traits.

To all this jointly and collectively we owe the position of vantage of present-day psychology—a product of the last fifty, for the most part of the last twenty-five, years. And all of it—certainly almost all of it—was inspired and directed by the view of psychology as the study of human behavior. It is 90 per cent. if not 100 per cent. behavioristic, yet was accomplished not by so-called (Watsonian) behaviorists but by the contributions of scientifically minded psychologists who gave to that phase of "behaviorism" for which Watson claims a proprietary right, precisely the recognition it deserved.

For any one, whatever his attainments or achievements, to make the presumptuous gesture of claiming for his variety of "behaviorism" or any other "ism" the sole warrant of science, to discard all the labors of his fellow psychologists as misguided rubbish, to inform the many workers in the field of heredity that they are on a false scent and to repeat the information to the psychiatrists, to predict that in a few years under the adoption of a Watsonian behaviorism all the important problems will be solved, to set forth a new dispensation, contrasting the darkness and futility of all psychology before 1912 (this is the Messianic year that Watson has adopted for his era) and the subsequent light (without sweetness), to mislead and misguide the public by misrepresenting the positions of fellow psychologists as continuing the "soul" psychology of an obsolete tradition—all this disqualifies any member of the scientific guild from the consideration to which his previous scientific contributions—as in the present instance—may have amply entitled him.

The earlier period of Watson's psychological career was a period of contribution, not of presumption. But from the popular lectures on "Behaviorism" and in increasing measure in the books here cited, the strident, advertising tone of irresponsible statement at times gives way to, at times flaunts and overrides the scientific contributions that continue to be scattered among his cavalierly pronouncements.

It is only in the perspective of fifty years of psychological progress that the bearing of this unpre-

[1] I have omitted from this summary the specific mention of the Freudian approach—in one respect the most influential factor in compelling the recognition of psychology—because it may be included in abnormal psychology and because it is better to avoid the issue of its scientific foundation. As a component of our present-day insight into human behavior its influence is momentous.

cedented situation becomes apparent. If any such extravagant and irresponsible claims, coupled with such lordly and superman-ic disdain for one's fellow scientists, issued from a man of slight consequence and no standing, it would be easy to ignore them and await their oblivion with unconcern. But Watson's standing is unchallenged, his ability exceptional, his contributions notable.[2] If some modern scientific Machiavelli had devised a course to confound the world, he could have done nothing shrewder. First establish yourself as a man of science, make contributions that command respect, then with the prestige of such authority throw the labors of every one else into the discard, announce the new era of your own reforms and proceed in triumph.

But that procedure was made possible only by the most distinctive product of American civilization (or the lack of it)—advertising. "Behaviorism" (à la Watson) has a small but unmistakable scientific following; it deserves it. Its most notable representative is Lashley, whose conclusions are presented with scientific precision, free from any pretense or glamour. The vast majority of behaviorists decline to subscribe to the suicidal curtailment of their science which Watson advocates. Watsonism of the later period has not made its way by scientific endorsement but by popular appeal. The editors of popular magazines are the sponsors of this "Behaviorism." It made good copy, and they put it over. It is foolish to ignore this situation, though there is no need to become unduly excited about it. But it is important for psychologists to have their co-scientists in other fields understand the situation. It is a matter of serious concern that this untoward incident in the neo-history of American psychology has occurred. Its effect on the prestige of psychology in America is unfortunate.

I shall believe as long as I can that Watson is sincere in his views and has only the interests of truth in mind, though the belief involves a logical strain, since the evidence of Watson's intellectual ability is convincing. But this as well as my appreciation of the important place that he occupies among contemporary psychologists must give way to the plain duty of placing on record the actual situation (as I see it) which an unprecedented method of circulating scientific conclusions has precipitated upon an otherwise quite sufficiently troubled science. Psychology, however, is not in a precarious position. It will survive the "strange interlude" of "Behaviorism" and pursue its proper and profitable behavioristic career.

JOSEPH JASTROW

[2] Inasmuch as I used Watson's earlier book as a text in "Animal Psychology" so long as I conducted that course, my own appreciation is on record.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE ANALYSIS OF DILUTE SOLUTIONS OF METHYL ALCOHOL

IN the course of an investigation of the degree of hydration of sucrose under J. W. McBain, it became necessary to find a method for the analysis of methyl alcohol solutions that should be much more accurate than the customary distillation and determination of the density of the distillate, and at the same time should be easily and rapidly performed.

A review of the available methods revealed none that was suitable, so that it became necessary for me to devise my own procedure.

Among the various suitable reactions, oxidation by chromic acid proved most suitable. Numerous analytical procedures have been devised based on the ease with which chromic acid is reduced in the presence of sulfuric or phosphoric acid. See, for example, *Nature*, 122: 903, 1928, and especially *Biochem. Zeit.*, 170: 18, 1926. In the latter reference is listed a large number of compounds subject to quantitative oxidation with chromic acid. The usual methods of determining the quantity of chromic acid consumed are, however, inconvenient, to say the least.

My procedure for methyl alcohol (and by modification it is applicable to a great variety of analyses) is as follows: The dilute solution containing the alcohol is distilled unless it is known that there is no other oxidizable substance present. All of the methyl alcohol will be removed in the first half of the distillate. An aliquot sample is placed in a 125 ml Erlenmeyer flask and an excess of sodium dichromate solution added. The whole is made 12 normal with sulfuric acid. It is convenient to have the acid and dichromate solution mixed in such a proportion that after the sample is added the acid normality will not be less than 12. The flask is then corked loosely and heated on a water bath for ten minutes. The flask is then cooled, the contents washed into a beaker and the excess dichromate determined by titrating with ferrous sulfate, determining the end point electrometrically. A smooth platinum electrode is used in the solution, the circuit being closed through a salt bridge to a calomel electrode. When the last drop of ferrous sulfate is added, the registered potential drops between two and three tenths of a volt, making an exceedingly sharp indication of the end point. Needless to say, if one passes the end point it is easy to titrate back.

The accuracy of the method is limited only by the accuracy and precision of the volumetric measurements and apparatus. I have found it not at all difficult to determine the alcohol content of a 10 ml