

On Friday afternoon a large number of members availed themselves of a boat trip in the harbor on the city fire tugs, while others visited the soap plant of the Larkin Company. In the evening about eighty attended a subscription dinner at the Hotel Iroquois.

The whole of Saturday was devoted to an excursion to Niagara Falls. A visit to the Power House was followed by a luncheon given by the Natural Food Company, and this by a trip over the Gorge Route.

The total registration at the meeting was 178. The secretary, Dr. W. A. Noyes, announced that as the result of a mail vote with reference to the establishment of an abstract journal in cooperation with the Chemical Society of London and the Society of Chemical Industry, seventy-nine adverse votes had been cast out of a total of about 700 so far received. Four eminent scientists were elected honorary members of the society: Svante Arrhenius, Walther Nernst, H. W. B. Roozeboom and Julius Thomsen.

The next meeting will be held at New Orleans, December 29 to January 1, 1905-6.

AUSTIN M. PATTERSON.

SCIENTIFIC BOOKS.

A System of Metaphysics. By GEORGE STUART FULLERTON. New York, The Macmillan Company, 1904. Pp. x + 627. Price, \$4.

Professor Fullerton makes in the work before us a very creditable attempt to be true to the promise of his title-page; he constantly bears in mind that he has set himself not merely to produce a series of essays on metaphysical subjects, but to set forth the whole scheme of his science in a complete and orderly manner. Only a reader who, like the present reviewer, has himself had occasion to do the same thing can fully appreciate the difficulties of such a task and the recognition fairly due to even a partially successful execution of it. Under Mr. Fullerton's hands the

subject falls into four main divisions: Part I., 'The Content of Consciousness,' starting from the standpoint, assumed by the author to be that of psychology, of a world of experiences primarily given as states of the individual consciousness, aims at showing the unsatisfactory nature of such a general conception of the real, and the need for some more fundamental metaphysical interpretation of experience. Part II. discusses the 'external world' in a series of chapters devoted mainly to the doctrine of space and time, and concluding with a rather perfunctory defense of the conception of existence as a perfect mechanism against the 'descriptive' view of mechanical science championed by Kirchhof, Mach, James Ward and others. Part III., 'Mind and Matter,' deals at length, and with much acuteness, with the problem of the relation of mind and body, and contains, besides a very vigorous and damaging attack upon the subjective idealism which denies the reality of any knowledge of things as distinct from our own mental states, Professor Fullerton's own ingenious version of the doctrine of psychophysical parallelism. Finally in Part IV., 'Other Minds and the Realm of Minds,' the author deals with the traditional problems of the old rational psychology and natural theology. Speaking summarily, it may be said that Professor Fullerton's position in metaphysics is that of a critical realist. He holds, that is, that there is a real physical world of extra-mental objects, and that of that world we have a direct, and not merely a symbolic or representative, perception. Further, he maintains that the whole world of minds and bodies alike forms a complete and perfect mechanism, the relation between the bodily and mental aspects of it being a purely logical 'parallelism,' and consequently adopts a purely determinist view of moral action. Finally he so far follows in the footsteps of Kant as to regard the existence of God and the reality of a future life as matters beyond the limits of demonstrative science, but as affording scope for a legitimate exercise of faith.

It is hardly to be expected that the execution of so extensive a work should be equally

satisfactory in all its parts, and, speaking for myself, I can not but think the last two divisions of the book much superior to the two which precede them. The reason for the difference in value seems to be that the author is much more at home in the psychological problems with which these sections mainly deal than in the realm of pure logic and epistemology. Indeed, the very presence of Part I. might, perhaps, be regarded as an unfortunate mistake. The conception of the experienced world as consisting of 'states of consciousness' is not only in itself an absurdity, as Professor Fullerton himself shows conclusively, and not without humor, in the chapters of Part III. which deal with the doctrines of Clifford and Karl Pearson, but is an absurdity not likely to be entertained by the student except as the result of misguidance at the hands of a psychologizing metaphysician. Hence it seems a pity to start the reader off on a false scent for the purpose of afterwards demonstrating his error to him. Surely it would have been better to make a beginning with the 'naïve realism' which is habitual to all of us in our every-day life, and to assume from the first as a working hypothesis that we have a direct perception of objects which, whatever their nature, are to be carefully distinguished from the processes by which they are cognized.

The author's second part is, perhaps, the least satisfactory portion of the whole work. Mr. Fullerton is apparently quite unfamiliar with the indispensable foundation of any satisfactory doctrine of space and time, viz., the modern mathematical theory of infinity and continuity. Hence his attack upon the Kantian 'Aesthetik' inevitably becomes a very grave *ignoratio elenchi*. The real objection to the 'Aesthetik' is, of course, that no analysis of mathematical concepts can be adequate which fails to recognize that their application to space and time is logically a secondary affair, and requires to be preceded by the logical investigation of relations of number and order considered in complete abstraction from the special nature of the terms numbered and ordered. This fundamental

point is ignored by the author, who prefers to furbish up old difficulties about motion which may puzzle the non-mathematical reader, but will be seen at once by those acquainted with the mere outlines of modern investigations into infinity and continuity to be idle fallacies, and that of a kind which, if sustained at all, must be fatal not merely to the special theories of Kant, but to the whole spatial and temporal scheme of mathematical physics. Mr. Fullerton himself attempts to find a way out of his own self-created difficulties by adopting Berkeley's analysis of space and time as perceived by the senses, but with the mental reservation that the space and time which are conditions of the existence of the real extra-mental world are just what the mathematical physicist declares them to be. He forgets that according to Berkeley there is no extra-mental world and, therefore, no such 'real' space or time, and that according to himself the infinitely divisible and continuous space and time of the physicist are full of logical contradictions and must, therefore, be purely unreal.

Even in the latter half of the work the writer does not seem to be by any means as successful on the constructive as on the destructive side. Thus, ingenious as his defense of 'parallelism' is, he nowhere seems to have given any more cogent reason for adopting a parallelistic rather than an interactionist position than the obvious reflection that interaction is inconsistent with a purely mechanical interpretation of the universe. But that any science really demands our acceptance of absolute mechanism as the truth about things is a statement which he makes no attempt to prove, nor does he show any real comprehension of the meaning of anti-mechanistic philosophers, or of the gravity of the difficulties which have to be faced by a relentless and consistent theory of pure mechanism. A reader who should take his notions on the subject from Mr. Fullerton's fifteenth chapter would, indeed, probably go away with the notion that Dr. Ward (and? Mach) is an unscientific and credulous person who thinks that after all there is 'nothing in' modern

mechanical science. There is, in fact, nothing that I for one desiderate more in Professor Fullerton's metaphysical structure than a serious and thorough discussion of the question, what are the real logical postulates of mechanical science, as distinguished from the mechanistic philosophy professed by some, but by no means all, men of science, and how far those postulates imply the belief that the actual course of any real process is through-and-through mechanical.

But the adequate discussion of this problem presupposes a much more searching critical analysis of the logical character of knowledge than Professor Fullerton has seen fit to undertake. One very important issue which such an analysis would raise would be the question whether an empirical realism, such as that successfully upheld by Professor Fullerton against the subjective idealist, does not admit, or possibly even demand, as its complement a further doctrine of critical or transcendental idealism.

A. E. TAYLOR.

SOCIETIES AND ACADEMIES.

THE NEW YORK SECTION OF THE AMERICAN CHEMICAL SOCIETY.

THE last regular meeting of the New York Section of the American Chemical Society was held in the Assembly Hall of the Chemists' Club, 108 West 55th St., Friday, June 9, at 8:15 P.M. The chairman, Dr. Wm. J. Schiefelin, presided.

The reports of the secretary and treasurer for the year 1904-1905 were read and approved. The secretary's report showed a net gain in membership of the section of sixteen.

The program of the evening was as follows:

Some Condensation Products of 1 Phenyl-naphthalene-2-3-Dicarboxylic Anhydride: NORMAN A. DU BOIS.

It was shown by Michael and Bucher that acetic anhydride and phenylpropionic acid act upon each other to form a new compound, α phenylnaphthalene-dicarboxylic anhydride. The reaction is said to be practically quantitative. In preparing quantities of this compound for experimentation, a modification in the usual method for the preparation of phenyl-

propionic acid was discovered by the writer. Formerly it was prepared from cinnamic acid by esterifying and brominating, and then boiling the cinnamic ethyl ester dibromide with alcoholic potash for eight hours. It was found that this long boiling was unnecessary and that as good a yield was obtained if the alcohol was distilled off immediately after dissolving the cinnamic ethyl ester dibromide.

The α phenyl-naphthalene-dicarboxylic anhydride can be condensed with resorcin in the presence of zinc chloride, to form a compound analogous to fluorescein. This fluorescein analogue, when treated with the theoretical quantity of bromine in glacial acetic acid forms a tetra bromo substitution product, analogous to eosin. Both of these compounds are direct dyes for animal fibers. The fluorescent analogue also forms iodine and chlorine substitution products.

The α phenyl-naphthalene-dicarboxylic anhydride can also be condensed with most other phenols to form condensation products analogous to those formed by phthalic anhydride.

On the Preparation of Hydrobromic and Hydriodic Acids: L. H. FRIEDBURG.

Bromine is allowed to trickle into paraffin which is kept in a molten condition by placing the flask containing it in a shallow steam-bath. The bromine vapors which will pass over along with the hydrobromic acid, are partly absorbed by a second paraffin-containing flask, joined to the first and standing together with it in the water-bath.

The fact that iodine and paraffin, or better still, iodine and vaseline, will allow the production of hydriodic acid was a further novelty. Here the gas produced is not washed but simply passed through a big empty bulb-tube before allowing it to be absorbed by water.

Praseodymium Tetroxide: CHARLES BASKERVILLE and J. B. THORPE.

That which has been regarded as the tetroxide, Pr_2O_4 , is a brownish-black substance resembling manganese dioxide in appearance and conduct with hydrochloric acid. It should rather be called the dioxide. By fusing this dioxide with sodium dioxide a yellow-