magnetism and electricity. The book has been written to meet the needs of university students, and in the first part it is assumed that the student has not yet had an opportunity to become acquainted with the methods of calculus; but this assumption is soon discarded.

The range of the first volume may be briefly indicated by an enumeration of subdivisions. After an introduction of fifty pages come the subjects of motion, force, work and energy, harmonic motion, radiant propagation of vibratory motion, universal gravitation, the potential theory, gravity. Then follows a section on instruments and methods of measurement, and separate sections on the theory of gases, theory of liquids and theory of solid bodies, the last including a discussion of elasticity and of friction. The style of presentation is clear and direct, and frequent brief summaries help the reader to seize upon fundamental principles. Each section closes with an index of literature relating to its subject matter.

Quite possibly the state of the American market may not warrant the translation of this excellent treatise into our language, but it is well worth the attention of those who are sufficiently interested to examine the German edition. W. LECONTE STEVENS.

SOCIETIES AND ACADEMIES.

BIBLIOGRAPHICAL SOCIETY OF CHICAGO.

A REGULAR meeting of the Bibliographical Society of Chicago was held in connection with the annual meeting of the American Library Association on the afternoon of Wednesday, June 22, at Niagara Falls. After the president's address by Mr. A. G. S. Josephson, a paper on the 'International Catalogue of Scientific Literature,' by Dr. Adler was read. This paper is published above.

Dr. Herbert Haviland Field, of Zürich, was introduced and gave an account of the Concilium Bibliographicum founded in Zürich by the third International Congress of Zoology, in 1895. This institution collects and records all publications in biology, giving to each article separate cards of Library Bureau size. These cards aggregate at present twelve million for 150,000 titles, and thus constitute one of the largest, if not, indeed, the largest, collection of printed bibliographical cards. The Concilium Bibliographicum regards it as a technical triumph to have produced these cards for sale at the low price of one fifth cent per card. The cards are classified according to a methodical classification which is a development of the Dewey decimal system. For each topic found in the various publications there is a separate card published. In determining the various entries the text and not the title of the publication is considered, the number of entries for a single work often attaining ten or twelve. Besides supplying libraries and other institutions with complete sets of cards, the Concilium permits individual investigators to order cards for their own specialties. Thus the traveler going to Borneo could apply for the cards dealing with the fauna of Borneo. He would receive these at a nominal charge. In like manner any topic of investigation whatsoever can be asked for. The Institute is to-day nearly self-supporting, though it receives an annual subsidy of $1,500 from the Swiss Federal Government. It confidently hopes that bibliographers in America will lend it their support in obtaining similar financial aid in the United States.

Mr. Wilberforce Eames, of the Lenox Library, New York, presented a report in favor of the formation of an American Bibliographical Society and recommended that the Bibliographical Society of Chicago be authorized to take the initiative in the formation of the society. The report was adopted and active steps toward organization will be taken in the fall. CHARLES H. BROWN,

Secretary.

DISCUSSION AND CORRESPONDENCE.

THE ST. LOUIS CONGRESS OF THE ARTS AND SCIENCES.

TO THE EDITOR OF SCIENCE: In the May number of the *Atlantic Monthly* there appeared an article by Dr. Hugo Münsterberg, giving, in a quasi-official manner, a statement of the plans for the St. Louis Congress of

the Arts and Sciences. The fact that a literary rather than a scientific journal has been selected as a means of communication to the public, and that the plan itself as there set forth is philosophical rather than scientific, affords my justification for writing on a matter which my own technical scientific qualifications would under ordinary circumstances hardly entitle me to discuss, excepting possibly as respects one group of the sciences.

That the article bases the working plans of the St. Louis Congress of Arts and Sciences upon a particular methodology emanating from a particular school of metaphysics, not as yet numbering among its adherents any great number of either scientific men or philosophers, naturally arouses certain apprehensions. I write chiefly in the hope that some explanation may be forthcoming which will allay these apprehensions, which I find I am far from alone in feeling. Even after the explicit statements of the article, one can hardly believe one's own eyes, and is sceptical of one's right to attribute to the distinguished committee the notion of basing the Congress upon a particular scheme of metaphysical logic. One is sure the plan must be capable of construction in some other way. Accordingly I beg in advance the pardon of the committee if I should attribute to it in my following remarks a plan which as a matter of fact it has not fathered.

1. The article begins by setting forth an idea which is rational and feasible, and which would probably command general if not unanimous assent: the idea that the Congress should concern itself with the general aspects and bearings of the sciences, their relations to each other and to the unity of human knowledge and endeavor, rather than with purely specialized questions and researches.

2. Apprehension begins when we read: "The natural condition would be a plan in which every possible striving for truth, every theoretical and practical science would find its exact place. * * * It must be really a plan which brings the inner relation of all branches of knowledge to light * * * a ground plan which would give to every section its definite position in the whole system" (p. 674 of the *Atlantic Monthly* for May, 1903). It is repeatedly stated that the chief feature of the plan is that the arrangement of the sciences chosen is not one of practical convenience or effectiveness, but is one based upon a logical theory of knowledge. It is hardly necessary to point out the radical difference between a Congress which should work along the lines of the generalized aspects and interests of the sciences, and a Congress based upon a previously formulated and predetermined scheme of the unity of knowledge, or to dwell upon the *nonsequitur* from the first notion to the second. It is not the Congress of scientific and philosophical workers which is to bring to light (or bring nearer to the light) the unity and interrelation of the various movements of contemporary intellectual life. No, a necessary precondition of the work of the Congress is that it follow the lines of a predetermination of what the unity really is, a notion foreordained by a committee in charge of the Congress! One naturally asks the pardon of the committee for attributing to it even the passing fancy of a scheme at once so presumptuous and so futile.

3. As we read further we learn that this precondition of a 'ground plan' has been met, the committee having officially adopted a 'ground plan.' From the historical point of view, we learn from the article that contemporary intellectual life is officially decreed by the committee to have got beyond materialism, positivism, psychologism, indeed beyond any scheme in which the mental and physical sciences are coordinated with each other. The practical bearing of this appears when we are told that each department is to have an address on the historical development of its own line of work in the last century. It will certainly tend to decrease intellectual labor that each speaker know in advance the 'ground plan' of development which his own group of sciences has followed in the last century. There are still those, however (of whom I confess myself one), who would prefer to gather their ideas of what the actual historical move-

ment of the century has been from the results of the deliberate investigations of scientific leaders in a large number of fields, rather than to accept the conclusions of even so distinguished a body as the committee which has framed the plan for the Congress.

4. The 'ground plan' is also set forth in its logical scope and symmetry. There are five classes of sciences; the divisions being based upon the distinction, first between 'purposes' and 'phenomena,' and then between such purposes and phenomena as hold good for the individual and those which are more than individual in quality. There is we learn a radical gulf between purposes and phenomena. Purposes 'are not to be explained but to be interpreted' (*sic*, p. 677); they represent values which are to be appreciated, not described; they are to be approached by teleological not by causal methods (pp. 676–677). The student of art, history, literature, politics, jurisprudence, education, is, we are told, occupied with matters of this sort. Just what will happen to those students of art, history, politics, education, etc., who persist in considering that their concern is with phenomena, with their description and explanation, and who are desirous of employing psychological methods in this description and explanation, we are not told. Then 'phenomena and purposes' both subdivide themselves; each branches into those facts which are individual or hold only for one subject, and those which hold for every possible subject. The sciences which deal with the individual *phenomena* are the mental; those which deal with individual *purposes* are the historical. The sciences which deal with more than individual phenomena are the physical; those which deal with more than individual purposes are the normative, viz., metaphysics, logic, ethics and mathematics. Then we have a fifth class of sciences: those which deal with the relations between 'physical or mental, normative or historical facts on one side, and practical ends of ours on the other' (p. 678).

While it is somewhat confusing to discover in this fifth classification that purposes and norms turn out to be only facts, after all, and that even after we have gone through the sciences devoted to norms and purposes there still remain practical ends to be dealt with, yet the point that I here raise is not that of the ultimate value or final truth of this classification. The point is that it is a scheme characteristic of one limited school of philosophical thought. The real question at issue is the wisdom of basing a world's congress of arts and sciences upon any sectarian intellectual idea representing some particular *a priori* logic. Why should the committee take it upon itself to define the constitution of the unity of human knowledge, and to provide ready-made a plan or map of the interrelation of all its parts? Why is it not the business of the scientific and philosophical workers called together from all parts of the earth to consider, collate and present their own ideas about the structure and the divisions of the unity of human knowledge? Is it not the business of such a congress to further a consensus of judgment, or at least of inquiry, regarding just the features which the committee, according to the *Atlantic* article, has seen fit to prejudge and forestall?

One might also raise the question whether any scheme has a right to arrogate to itself the title of a 'ground plan' of the *unity* of human knowledge whose final result is to separate the psychological sciences from logic, esthetics and ethics, to separate all of these from the historical sciences, and the historical sciences in turn from the sociological sciences, and then to set up a fifth division of practical sciences to furnish 'links' for what has thus been chopped up! It would involve discussion of the merits of the particular plan proposed to argue that any plan which terminates in such arbitrary divisions has thereby experienced a *reductio ad absurdum*. But it is within the scope of the present discussion to indicate that such divisions, if they have any effect at all, can only operate prejudicially to the freedom and completeness of the intellectual discussions of the congress. The essential trait of the scientific life of to-day is its democracy, its give-and-take, its live-and-let-live character. Scientific

men of to-day are struggling hard and successfully to break down previously existing artificial walls separating different sciences, and to secure a continuous open and free field of inquiry. The most active sciences of the day have bifold names—astro-physics, physical chemistry, geo-physics, physiological chemistry, psycho-physics, social psychology, to take the first names that suggest themselves. Pick up the first authority that comes to hand upon the science of language: we read that language has two sides, meaning and form; that the explanation of meaning is a matter of psychology and of logic, while the problems of form are treated by phonetics and phonology which are a combination of physics and physiology. Turn to the committee's classification and we find that the science of language is officially recognized as a science of 'purposes,' not 'phenomena,' and hence excludes psychology. It is a science of *individual* purposes, and hence excludes logic. As a science of purposes, not phenomena, it also excludes physics or physiology or any combination of them. The case is typical, and conclusive of the fated practical inefficiency of a plan which attempts to arrange sciences—*i. e.*, branches of inquiry—according to *a priori* logic. The 'chance combinations of the university catalogue' in the laying off of the fields of inquiry may not conform to any existing 'ground plan' of metaphysical logic; but they have at least the modest merit of representing the vital activities of those engaged in the cooperative pursuit of truth and the building up of the working system of human knowledge.

The dilemma that presents itself after reading the article is the following: Either the scheme is one for presentation and discussion in literary and philosophical journals, not intended to have any influence upon the practical conduct of the Congress, or else it represents a theory of the constitution and divisions of human knowledge to which the various sections and subsections are really expected to conform themselves. In the first case, it is impossible to see why, in the *Atlantic* article, so much stress is laid upon the philosophical basis and aim of the Congress, upon the fact that it is an arrangement based not upon considerations of practical convenience, but upon a logic of knowledge. In the second case, the effect upon the Congress itself can only be disastrous. The imagining of some one invited to speak who does not accept the scheme, either in general or in its bearings upon the particular group of sciences which he is called upon to discuss, will serve as a convenient symbol for presenting the practical logic of the situation. Is he to decline because he can not accept the preordained formulations of the committee? If so, is such a result regarded as desirable from any point of view? Or is he to accept and to proceed with a complete ignoring of the 'ground plan' set forth? If so, what is the significance of the 'ground plan,' and how does the scheme in any way differ from one which should have based itself purely upon an empirical grouping of current lines of research made upon the basis of convenience?

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Concerning the Word Barometer.

To the Editor of Science: In the issue of April 3, Dr. H. C. Bolton, quoting from Birch's edition of Boyle's Works, 1744, finds the word 'barometer' first used by Boyle in 1667, and he concludes that he probably used it as early as 1665.

In the issue of May 1, Mr. A. L. Rotch shows that Boyle did use the word as early as March 24, 1665.

I have before me the works of Robert Boyle, the title page of which tells us that the work was 'Printed for A. Millar, opposite Catharine Street in the Strand MDCCXLIV.' This edition is in five folio volumes and contains a preface by Thomas Birch dated London, November 16, 1743. It is not, however, the 'Birch' edition quoted by Dr. Bolton, as the page references do not coincide.

I find Dr. Bolton's quotations given on page 28 of Vol. III., and on p. 449 of Vol. II. The paper quoted by Mr. Rotch appears twice, first in Vol. V., p. 130, under the title as given by Mr. Rotch; second in Vol. II., p. 543, un-