'The Contagiousness of Phthisis Pulmonalis,' by Dr. E. L. Shurly, of Detroit.

'Climate in Relation to Renal Disease,' by Dr. J. B. Walker, of Philadelphia.

'Climate as it affects the Skin and its Diseases,' by Dr. L. D. Bulkley, of New York.

'Hygienics of the Skin,' by Dr. L. D. Judd, of Philadelphia.

'Hydrotheraphy in the Treatment of Insomnia,' by Dr. Irwin H. Hance, of Lakewood.

'Altitude and Heart Disease,' with report of cases, by Dr. R. H. Babcock, of Chicago.

'Prognosis in Chronic Valvular Affections of the Heart,' by N. S. Davis, Jr., of Chicago.

'Treatment of the Cardiac Asthenia of Pneumonia,' by Dr. H. L. Elsner, of Syracuse.

'Empyema from a Surgical Standpoint,' by Dr. Johh C. Munro, of Boston.

'Traumatic Rupture of the Heart, without Penetration of the Chest Wall,' with a case, by Dr. Richard C. Newton, of Montclair.

'Cold Wave of February, 1899,' by Dr. Guy Hinsdale, of Philadelphia.

Other papers by Drs. R. G. Curtin, C. F. McGahan, Harold Williams, F. H. Williams, E. O. Otis and V. Y. Bowditch, S. G. Bonney and H. S. Anders.

The annual dinner of the Association was held at the Manhattan Hotel, at which the President, Dr. Beverley Robinson, of New York, presided. On the following day the Association made a visit to the Loomis Sanitarium in Liberty, Sullivan County, New York. This institution was founded 1895 in memory of Dr. Alfred L. Loomis, the first President of the Association, for the treatment of tuberculosis. It has a favorable situation, 2,300 feet above tide, and is 120 miles from New York, on the Ontario and Western Railway. The remarkable success which has attended its work has been due in great measure to its physician in charge, Dr. J. E. Stubbert, liberally aided by the philanthropic support of Mr. J. Pierpont Morgan and the ladies who are associated in its management.

The scientific work of the Climatological Association tends to the better knowledge of the various American climates and health resorts and their employment in the treatment of disease.

The subject of tuberculosis is now receiving universal attention by the medical profession, and the public are being interested in measures looking to its prevention and restriction. It is encouraging to note that in all our large cities the mortality from this disease is gradually falling, and through societies of this kind knowledge is disseminated which affords the public greater protection and prolongs life. The resources of New York and Pennsylvania for the climatic treatment of pulmonary disease are not so well known as they should be. Neither are the mineral springs of the United States fully understood and intelligently used. The Transactions of the Climatological Association, now numbering fifteen volumes, have contributed in no small degree to the better knowledge of this extensive subject.

The following officers were elected for the ensuing year: President, Dr. A. Jacobi, of New York; Vice-Presidents, Dr. R. H. Babcock, of Chicago, and Dr. John W. Brannan, of New York; Secretary, Dr. Guy Hinsdale, of Philadelphia; Representative to the Executive Committee of the Congress of American Physicians and Surgeons, Dr. F. I. Knight, of Boston.

The next meeting will be held in Washington in May, 1900. GUY HINSDALE,

Secretary.

SCIENTIFIC BOOKS.

SOME SMITHSONIAN PUBLICATIONS.

Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures and conditions of the Institution to July, 1896. 8vo, lii + 728 pp., lxi pls. Washington, 1898. [Received by the Bureau of International Exchanges, January 25, 1899.]

Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures and conditions of the Institution for the year ending June 30, 1896. Report of the U. S. National Museum. 8vo, xxiv + 1108 pp., cxcviii pls. Washington, 1898. [? 1899.]

Proceedings of the United States National Museum. Volume XX. Published under the direction of the Smithsonian Institution 8vo, xii + 932 pp., xcvii pls. Washington, 1898. [? 1899.]

The activities and influence of the Smithsonian Institution have so extended that, instead of a modest Report of some hundred pages, its annual publishing output comprises several bulky octavo volumes. It is only 15 years since the Report of the United States National Museum was issued in distinct covers from that of the Smithsonian Institution. And now, to judge from the copy submitted for review, even this has reached limits that transcend the binder's art, and suggest that a further division into volumes would be beneficial. The line of division is obvious, for the Reports both of the Smithsonian and of the Museum owe their present thickness chiefly to the articles of general interest which are printed after the annual official statements. The public is, doubtless, grateful for these admirable articles, but its gratitude would be increased were they presented in more convenient form. The numerous readers that will be found for Mr. Thomas Wilson's richly illustrated account of 'Prehistoric Art' will not wish to be weighted with lengthy lists of accessions to the library, of new species described by the Museum staff, or of specimens sent to the Museum for identification. On the other hand, the professional museum-curator, who doubtless keeps the richly suggestive, one might say the classical, reports of the Smithsonian officials at hand for reference, will soon find his available space choked up with reprints of papers that he either has no longing for or already has in their original form.

The present Appendices to the Administrative Reports have, it is true, grown in a natural manner, on the one hand out of the summaries of progress in science that used to be attempted by the Smithsonian, and on the other hand out of short accounts or catalogues of specimens in the National Museum. Moreover, there may be something in the terms of the appropriation by Congress that renders the present mode of publication an official necessity. In such case a strong expression of the value attached at home and abroad to the several sections of these Reports, and of the inconvenience resulting from their union, may do something to facilitate a change.

There is another argument in favor of the proposed separation. The information contained in these reports is as out of date as that in an ordinary science text-book. The world looks for more actuality in news that come from the United States. There is little in this 'Report of the U. S. National Museum for the year ending June 30, 1896' that the intelligent readers of SCIENCE did not know nearly three years since. We all knew that "Under an order issued by the President on May 6, 1896, the National Museum [with the other departments of the Smithsonian Institution] was made subject to the law regulating appointments and promotions in the Civil Service of the United States." We have read all about the government exhibit at the Atlanta Exposition in Brown Goode's contemporaneous report. We have mourned for Professor C. V. Riley and Mr. R. E. Earll, and, alas! for the writer of their obituary notices, here reprinted from SCIENCE. We have heard enough—perhaps too much—about Alaska and the seal fisheries of Bering Sea. There is little left but the statistics previously referred to. And since the letter of transmittal is dated August 8, 1896, why should we have to await these 284 pages for two years and a half? The reason appears to lie in the elaborate papers contained in Part II., which, it is obvious, could not have been published in 1896. Internal evidence shows that Mr. Thomas Wilson's attactive work on Prehistoric Art, of 340 pages, 75 plates and 325 text-figures, was not completed in manuscript before 1897. Mr. Stewart Culin's fascinating account of the origin of chess and playing cards has an introductory note dated August, 1897, and contains quotations from matter printed in that year. The equally interesting account of the exhibit of Biblical Antiquities at the Atlanta Exposition, by Drs. C. Adler and I. M. Casanowicz, contains more than one such reference. It is not likely that Dr. Walter Hough's exhaustive monograph on the lamp of the Eskimo was ready for the printer before the articles that precede it. Why should not all these have been issued separately, or at least reserved for the 1897 Report?

To write any comprehensive review of the extraordinarily diverse matter in the three volumes before us would be impossible for a single individual, however unlimited his time. The papers following the Smithsonian Report are representative of the various branches of science, and the general reader will gain from them a fair idea of what is now being done by scientific workers. Most of them have appeared elsewhere, but English-speakers will be glad to have the translations of Dr. L. Königsberger on 'The Investigations of Hermann von Helmholtz on the Fundamental Principles of Mathematics and Mechanics,' Professor A. Cornu on 'Physical phenomena of the upper regions of the atmosphere,' O. Wiener on 'Color photography by means of body colors, and Mechanical color adaptation in nature,' Dr. Heim on 'The biologic relations between plants and ants,' H. Meyer on 'Bows and arrows in Central Brazil,' and J. de Morgan's 'Account of the work of the service of antiquities of Egypt and of the Egyptian Institute during the years 1892, 1893 and 1894.' As an example of work carried out under the auspices of the Smithsonian Institution, we are presented with Dr. J. Walter Fewkes' 'Preliminary account of an expedition to the Pueblo ruins near Winslow, Arizona, in 1896,' which expedition, it may be noted, accomplished its work some weeks after the annual report was transmitted to Congress. Other communications that appear to be published here for the first time are: 'Was primitive man a modern savage?' by Talcott Williams; 'Memorial of Dr. Joseph M. Toner,' by Ainsworth R. Spofford, and 'William Bower Taylor,' by W. J. Rhees. The rest of the articles are reprints, mainly from the Proceedings of the Royal Institution of Great Britain and from SCIENCE.

The more technical papers based on the collections in the U. S. National Museum are contained in Vol. XX., of the Proceedings of the Museum. In pursuance of the excellent policy pursued by the Institution, these have already been issued in pamphlet form, so as not to delay the publication of important scientific novelties. But it is to be wished that this policy could be carried into effect in a more practical manner. Let us take two examples. The volume opens with an elaborate and (thanks to the Elizabeth Thompson fund) richly illustrated work on the Rocky Mountain locust and its allies, entitled 'Revision of the Orthopteran group Melanopli (Acridiidæ), with special reference to North American forms,' by that eminent entomologist and bibliographer, S. H. Scudder. The work contains numerous new species and new genera. A key to the genera is given, and is said to have been 'issued in advance in the Proceedings of the American Academy;' but from beginning to end no hint is given as to the previous publication of the paper as a whole, and 9 workers out of 10 would be as likely as not to give it the date of the bound volume, which the title-page states to be 1898, but which, one may hazard a guess, was really 1899.* The tenth worker might have received the previously issued separate copy of Mr. Scudder's paper, though it was unknown to the laborious compiler of the section Insecta in the *Zoological Record* for 1897—a somewhat important fact in in this connection; or he might chance to see in the table of contents the affixed date, 'December 28, 1897.' Is this date intended for the date of previous publication? If so, a statement to that effect should have been repeated at the beginning or end of the article itself. Even the previously issued separate copies of these articles do not bear the exact date. The paper wrappers give the year (truthfully, let us hope!), but what we have been led to expect from American systematists is at least the month, if not the day or even the hour of publication, printed on the sheet itself. In the second example that we shall take, matters are more complicated. No. 1132 is 'Preliminary diagnoses of new mammals* * * * from the Mexican border * * *' by Dr. E. A. Mearns. The competition between the describers of species in this class is now so keen that the demand for dates is imperative. The Smithsonian meets the appeal with its wonted generosity. It gives three dates: the date of the bound volume, 1898 [or 1899]; 'Advance sheets, March 5, 1897;' and again, 'January 19, 1898.' What, then, is the date of *Neotoma cumulator*

*At any rate the volume has not yet been received by the British Museum (Natural History), 22 April, 1899.

Mearns? The date of the advance sheets is, in this case, given with the paper itself, and they are described as 'published.' But if so, there can be no meaning in the date 'January 19, 1898.' If, on the other hand, 'January, 19, 1898,' is regarded by the Secretary to the Smithsonian as the date of publication, then the advance sheets must be ruled out of court. What do you mean by 'advance sheets,' anyway? Are they proofs under revision? Are they to be had by the public? Can they substantiate a claim of ten or eleven months' priority? These questions are not rhetorical. We want to know. The ever-green preliminary notice is nuisance enough; but a preliminary notice that ranges vaguely between March, 1897, and February, 1899, ought to be snuffed out by its own absurdity.

To turn from these vexed and vexing questions to the papers themselves—After Dr. Scudder's monograph, which occupies nearly half the volume, the more important are Professor E. Linton's 'Notes on Cestode and Trematode parasites of fishes,' Professor Dean C. Worcester's and Dr. F. S. Bourns' 'Contributions to Philippine Ornithology,' Walter Faxon's 'Observations on the Astacidæ in the U. S. National Museum and in the Museum of Comparative Zoology [Cambridge, Mass.], with descriptions of new species,' Professor C. P. Gillette on 'American leaf-hoppers of the subfamily Typhlocybinæ,' Professor A. E. Verrill's and Miss K. J. Bush's 'Revision of the deep-water Mollusca of the Atlantic coast of North America, with descriptions of new genera and species. Part I., Bivalvia.' From these and the lesser papers in the volume it is clear that the U. S. National Museum plays an effective part in the advancement, no less than in the diffusion, of knowledge; and the high proportion of contributions from others than those on the staff indicates a total absence of that dog-in-the manger quality which often finds a congenial home in establishments of this kind.

Indeed, if there is one character more praiseworthy than another in these records of work done it is the spirit of helpfulness and fraternal cooperation that animates the whole. The concentration of the national collections in one group of buildings, the association of the Museum with an institution of such world-wide scope as the Smithsonian, the proximity of other administrative and scientific departments of the government, all tend to foster this spirit. Nevertheless, its development, as we see from the example of other cities, is not a necessary consequence; it needs cultivation. In Washington its growth is due less to favoring circumstances than to the high character and ideals of the men connected with the Smithsonian Institution, and notably of recent years to the charming personality and unwearying efforts of the late Assistant Secretary. A remarkable instance of this appears in the list of the scientific and administrative staff, which comprises among the Curators or Assistant Curators no less than 28 described as 'Honorary, and serving without salary.' The work done by these unpaid curators is no mere amusement; they take their share in the drudgery of registration, labelling and cleaning. It is true that the majority of them receive pay from the government in other capacities; but this emphasizes the point, for rivalry rather than cooperation between the various departments is the rule in most other countries. The gain, of course, is not wholly on the side of the Museum.

In harmony with these principles of mutual aid, the Museum differs from many national museums in its custom of sending out large quantities of material. Partly this is in connection with local exhibitions, and this branch of the Museum's activity may be compared to that of the Loan Section of the British Science and Art Department. Further, specimens are lent to scientific workers freely and in large quantities. Presumably this applies, not to specimens of historic interest, but to material in the reserve collection. No doubt some damage is done and some specimens may be lost in consequence of these operations. For all that, the Museum is a gainer, on the one hand by the awakening of national interest and the increased number of its correspondents, on the other through the elaboration of its material by specialists in all parts of the world.

Apropos of correspondents, those of the Smithsonian and the Museum are perhaps numerous enough already. Every citizen of the United States seems to be as tenacious of his right to

question the officers on any subject under the sun as he is of his right to shake hands with the President. The list of specimens sent to the Museum for identification during the year fills 24 columns. About 10,000 letters seem to have been received and replied to. The conchologists alone had to identify over 3,000 species and to write over 1,000 pages of correspondence. Defensive measures have become necessary. *Circular* 47, U. S. National Museum, stipulates that the material must be sent free of expense to the Museum, unless otherwise agreed upon, and that the localities from which the specimens were obtained must be given. The Museum reserves the right to retain, except under special arrangement, specimens needed to complete the national collection.

There are many other points in these Reports one would like to discuss did one not feel the information to be a little out of date. Attention may, however, be directed to Dr. J. M. Flint's account of methods for the public exhibition of microscopic objects (Rep. U. S. N. M., pp. 96, 97, pls. i.–iv.). There are two forms of apparatus; in both an ordinary microscope is employed, but in one the objects are fixed on a rotating disc, while in the other ordinary glass slips are attached by brass clips to an endless linen band passing over rollers. "Microscopes copied from the original here described have been in use for several years, and no irremediable difficulties have been found in the way of their perfectly successful operation." An apparatus of this kind has been in use at the Hamburg Natural History Museum for some years; but few, if any, other museums have followed this example. Perhaps Dr. Flint's account may induce them to adopt this method of overcoming the difficulty of exhibiting very minute objects. The foregoing is only one instance of the improvements in museum technique that are constantly being introduced by the energetic officers of the U. S. National Museum. It is the detailed account of such matters that makes the Report of permanent value to other museum-curators, while it evinces the hearty interest taken in their work by all members of the staff.

F. A. BATHER.

NATURAL HISTORY MUSEUM,
LONDON, S. W.

Introductory Logic. By JAMES EDWIN CREIGHTON. The Macmillan Company.

The aims of this book, as indicated in the preface, are three. It is intended for an elementary college text-book; it is founded on a belief in the value of the traditional 'formal' logic, and hence on a desire to conserve, just so far as may be, the forms and exercises of that logic; and the author hopes, before he has done, to have presented likewise a genuinely modern theory of thought. The first purpose, of course, must be kept in mind in judging ultimately both the omissions of the work and all the admissions into it that occur in the way of obvious reflection and simple enlarging comment. The aim of saving the greater body of the old logical teachings, is one which — provided only writer or teacher knows how to breathe again into the material some of the ancient Socratic living practicality and fresh keenness—the majority among instructors of raw classes would still approve of. Their most critical query, therefore, touching this phase of Professor Creighton's work, would be: How far is this endeavor reconciled with the author's third chief aim, that of satisfying also, in his expositions, the requirements of modern scientific truth and orderly completeness? And here, in this attempt of combining and correlating, in a purely elementary treatise, the methods, content and advantages both of the old logic and a newer one, is plainly intended to lie the special feature of our book; as here, indeed, would appear to be afforded, to any writer, his most distinct opportunity for achieving a marked success, if not even his most valid reason for writing at all. For here—it would seem at least—is the largest room for competition with a number of most excellent text-books already outstanding. Thus, on the one side, Minto's Logic is an almost ideally satisfactory beginner's-manual, save in the important circumstance that it hardly more than informs the student of the existence of the modern profounder *theory* of thought; while, on the other hand, a work like —say even Bosanquet's Essentials of Logic, with all its incomplete expression and the tension in its style—presents the broad outlines of the organic view of thought with an admirable philosophic ability, but too far ignores, to ful-

fill entirely the uses of an ordinary introduction, the traditional staple of logic. These simple analyses and operations, as a matter of fact, besides retaining still a certain real point and meaning, would deserve some special consideration if only from the circumstance that, the new branch of induction aside, they are substantially what, in the popular notion and even in the common run of handbooks, will be always confronting the student *as logic, sole and simple.* Professor Creighton commendably would recognize these facts more completely than Dr. Bosanquet has cared to do.

The first two chapters of his book Professor Creighton devotes to an Introduction. The definition of logic, with which he sets out, suffice it to say, is thoroughly modern in spirit. So, too, his differentiation of the function and materials of logic from those of psychology is carried out in a modern, and, moreover, a soundly practical way. In both these connections it would, indeed, have been instructive to have been given some moderately searching review of the effect of different conceptions of the real nature of thought; but this, doubtless, was a topic felt to lie outside the scope of the book. On the venerable theme whether or not logic is an art as well as a science, the author expresses himself thus: The analyses of logic are capable of a practical application, but not to the extent of constituting an art. Thinking is too flexible to enable us, on the basis of our theoretical knowledge, to lay down, as we can in photography or even in medicine, rules for its definite guidance. It is possible to prescribe only the general conditions that must be observed in reasoning correctly.—The question here of our agreement or otherwise will largely be a verbal one as to how an art is to be defined. Professor Creighton himself speaks of the Aristotelian logic, in the ordinary representation, as perhaps more properly described as an art. Still, it may be suspected whether Professor Creighton's general denial of a strict art-character to logic does not hinder him, in his subsequent exposition of the old syllogistic logic (his *exposition*, but *not* the admirable 'exercises' he has appended at the close of the volume), from quite giving due emphasis to those exercises in Socratic 'dialectic' and 'induction,' in interpretation, definition and the like, wherein, rather than in the operation of mere abstract formulas —A's and E's, S's and M's, Baroko's and Bokardo's—lies the best discipline of 'formal' logic. But even more is it to be feared whether the conventional presentation of the old logic, which, as we shall see, Professor Creighton for the most part follows—whether this presentation, either in fulness or in order and method, can meet the requirements of science in the rigorous modern sense, and must not rather seek its sole justification in a paramount simple artistic than a strictly scientific interest and character.

The second chapter of the Introduction is very appropriately a historical sketch. A crying need in the maze of contemporary logical doctrine is a simple but accurate and all-around elucidation for the student—if only for the sake of enabling him to approach the literature intelligently—of the various connections and distinctions of logical standpoints and so-called departments; and of all methods, moreover, of effecting this end, the historical can hardly be denied to be the easiest and most enlightening. Professor Creighton undertakes such a historical explanation with reference to Deduction, Induction and the 'New' logic; and his sketch is concise and bright—so far as it goes at all. Thus his account of the origin, development and respective functions historically of the Aristotelian and the inductive logics is animated, to the point, and for the most part very satisfactory. When, however, we come to that logic out of whose point of view his own treatment is to be determined, he merely *says* that it has arisen under the influence of Hegel, but how it has done so, and what Hegel's logic itself is like, or what are its antecedents back to Kant or, perchance, to Plato—all this is utterly passed over. Assuredly this failure of the author's, after he has devoted ten pages to the origins and evolution of a logic (the syllogistic) which he does *not* accept, at least as final, to provide some account of the historical beginnings and course of growth of that conception which he *does* accept as adequate, is to be set down as a defect not remedied even by the systematic exposition of this truer view which we

get in Part III. of our book. How very difficult it is to put simply, and yet in orderly truth, the history of that fruitful notion of thought and logic which Professor Creighton adopts, everyone must appreciate who has endeavored to teach it; but then, in the degree that this history is essential for our students, its difficulty, as already remarked, is just a writer's best opportunity, and his best justification for adding one more book to the many.

A more thorough preliminary working out of the development from the old to a new logic would have been not only helpful to the student, but of service to the author himself. For, in his desire to accord to the old logic that due recognition which consitutes one of his prime objects, he feels obliged, apparently, in the exposition of 'Syllogism,' which makes up Part I. of our book, to reproduce in the main also the old conventional, half-false order of topics—Terms, Propositions, Immediate Inference, Syllogism, Fallacies—and the old narrow, distorted theoretical descriptions, with a fuller truth of relationships pointed out only incidentally or forgotten altogether. In Chapter I. of this same part, some general precautions are, indeed, put forward; but the author himself does not live up to them; how much less will the thoughtless student! As an extreme illustration of failure of fidelity to the interests of the higher standpoint and a reversion, for the time-being, to olden easy-going, slipshod methods, may be cited the treatment of Terms. We are abruptly informed (p. 46)—"*wie aus der Pistole*"—that "the first divisions which we have to notice is that into Singular or Individual, General and Collective terms." These being defined in the familiar way, we are given the further divisions into abstract and concrete, positive and negative, absolute and relative; which distinctions, it should be said, particularly that of abstract and concrete, are handled very well from the point of view of the old-time 'art of logic.' What, though, of 'new' theory of thought is there in this (p. 52)?—"Positive (terms) express the existence * * *. A Negative term indicates the absence * * *. Words which are positive in form, are, however, often negative in meaning * * *." Or what in this (p. 55)?—"The nature of everything is largely [*sic*] determined by the nature of the things with which it stands in relation * * *. It is, however, possible to make a distinction between words which are the names of things comparatively [*sic*] independent and * * *." It is but in keeping to find this chapter *ending* with the subject of extension and intension of terms, *i. e.*, with that which ought to form the *beginning* of the treatment of such distinctions as individual and general, collective and material, etc. Now, to be sure, all this can be no result of a sheer ignorance of the spirit and demands of modern logic. Part III. sufficiently shows the contrary; and even in this same first Part we are given a chapter such as that on hypothetical and disjunctive arguments, one that is fertilized throughout by organic reflections, and, in consequence, is the freshest, most interesting and best of this entire section of the book. Or perhaps it would be juster to say that Professor Creighton knows quite generally how to be interesting, as also to be neat and concise, and, in most matters, pedagogically tactful. His only difficulty is an unresolved conflict of ideals—of the elementary practical interest of the old logic, with the theoretic one of exhibiting the doctrines of this logic under a wider scientific point of view. In this conflict, now the one end and now the other, is lost sight of; but herewith, of course, the author's great purpose of satisfying the requirements of both old and new logic goes just so far by the board.

The faults of Part I., however, are in sharp contrast with the merits of Part II. The latter is, by all odds, the best-done portion of the book. Here, too, perhaps, there might still be room for a completer working-out of systematic implications and relations; and there remains, after all the author's great deductions, too orthodox an assent to the 'Five Methods' of Mill; nevertheless, Professor Creighton here plants himself, everything considered, on modern ground, and in the attitude of live *thought*, with the result of giving us one of the very best introductory treatments of Induction that we possess. Aside from the difficulty of correlation that must arise for the student from his not having previously been given a genuine theory of thought deductively regarded, but only the mechanics of scholastic syllogistic—the

true relation of induction to deduction is both made clear in an introductory chapter and soundly adhered to afterwards. These are throughout described, not as two distinct things, but as distinguished phases of one and the same total activity of thought; deduction throwing an explicit emphasis upon the particularizing and synthetic aspect, while induction emphasizes the analytic and generalizing sides. The nature and distinction, likewise, of observation and explanation are very adequately set forth in the introductory chapter. Observation, the author earnestly enforces, is not a mere staring at facts: "To observe well it is necessary to be more or less definitely conscious of what one is looking for; etc., etc." Though he reserves the express assertion of the influence of hypothesis on even preliminary observation to a later chapter, it is implied throughout. Naturally, therefore, the difference, too, between observation and explanation is regarded not as absolute, but as largely a mere convenient one—of the final articulate bringing to bear of reason on experience, in contradistinction from an earlier half-groping stage of the same thing. So, likewise, of course, the goal of induction is conceived to lie, not in a mere empirical, passive gleaning of causal connections and generalities, but in the completion of that explanation we have just been speaking of—the active expansion of the living system of self-conscious human reason for and by the inclusion of the facts under investigation.

After the introductory chapter come three others on Methods of Observation—the first dealing with Enumeration and Statistics, the two others with the Determination of Causal Relations—under which head is given an exposition of the Methods of Mill. All this is well done, though, as already suggested, the simple acceptance of Mill's 'methods' as undisputed descriptions of the actual procedure of science is open to grave dissent. However, there is no failure to point out the drawbacks of the several methods separately; nor is the author in any sense guilty of treating them as being more than what at best they are—mere methods of *observing*, that is to say, methods not for the final solution of scientific problems, but, as Welton has aptly put it, methods merely for suggesting *hypotheses*. The two chapters on Methods of Explanation—the first on Analogy and the second on The Use of Hypotheses—as well as the concluding chapter on Fallacies of Inductive Reasoning, call for no comment. All are very good pieces of work.

Part III. deals with The Nature of Thought. Starting from the view of thought as an organism, and of knowledge as a passage not from the inward and known to the outside and unknown, but always from a previous partial knowledge to one of greater perfection, the author goes on to point out that thought and knowledge unfold or develop in accordance with the general laws of evolution; that this development is a progressive process both of differentiation and integration; that the different intellectual operations, as conception, judgment and inference, or induction and deduction, are not separate processes, but stages in one and the same activity; and that the nature of this activity is essentially discoverable in its simplest and most elementary form, the judgment; —for the concept is not the original element, out of which judgment is afterwards compounded, but is only the series of judgments that have already been made and that serve as the starting-point for new judgments. Judgment, accordingly, is the main theme of this present subdivision of our study.

The chief characteristics of judgment as the type of all thought and knowledge are: (1) its universality (claim of truth for everybody); (2) its necessity (not a mere psychological compulsion, but one arising from the dependence of judgment on *grounds*); (3) that it is always both synthetic and analytic; (4) that it is constructive of a *system* of knowledge. In this connection, however, require to be considered also the so-called 'Three Laws of Thought.' As very commonly put, these pretended supreme 'axioms' of judgment are altogether false. Rightly formulated, though, they are real laws of thought, in the sense of being implied in and descriptive of the thought-process as just set forth. (The topic of laws of thought in general, or of Categories, Professor Creighton does not enter upon.) The development of judgment, from a merely *felt* to a *conscious* necessity, gives rise to types of judgment. The succession of these is traced on broadly Hegelian lines, from quality

through quantity (enumeration and measure) and causal connection (stages in this latter conception being pointed out), to the completed form of individuality (which is that of unified system).

The chapter on The Nature of Inference requires no special comment, except that the solution offered of the old paradox: How can the mind pass from the known to the unknown? —to the effect that there is no such passage, there being "always a certain amount of identity between the two ends of the process" [p. 326] —is hardly searching. Should not questions of this sort, if taken hold of at all, be handled with a certain thoroughness, even where it is inexpert novices that one has to reckon for? The concluding chapter, likewise, on Rational and Empirical Theories, calls for no discussion, its spirit beining manifest from what has been already related, and its upshot, in the rejection of either attitude in abstraction, sound, notwithstanding that the rationalism described is rather that of Descartes than the profounder doctrine of Kant.

Of this Part as a whole, this much only need be said. So far as it really proceeds, it is excellent and, doubtless, gives the entire book a value immeasurably beyond that of the dry, shallow, old-fashioned manual. And yet a questioning does arise, just how far the practically total avoidance of direct issue with the more fundamental difficulties concerning thought—the refusal to dip even lightly into the deeper waters of philosophy—is an advantage even for beginners, beginners of the sort who are ready to read such a book as this at all? For may it not be doubted if a bright student can fail—and is it not to be hoped that he shall not fail —to be perplexed by a groping perception of problems, a mere definite pointing out of which, or a mere hint towards whose solution, would have been of the greatest help to him, but which here are quite ignored? Surely our fear should be, not of bringing our pupils, when need is, into the labyrinths of metaphysic, but of ourselves not proving clear-sighted guides therein. However, in this point it may be that our judgments must turn on individual notions of how completely logic can and ought to be cut off from metaphysics.

Evidently in this work Professor Creighton has not given us the 'definitive' text-book—if there be any sense in the shallow favorite phrase. His book does not closely approximate its design. What he has produced is this, a book with a good many good things in it. These require a stricter organization; in parts, some supplementation; in other parts (perhaps), a pushing deeper back into philosophy; and, in one section, a considerable correcting. Yet with all these drawbacks—granted a teacher capable of coping with them—Professor Creighton's book is not unsuited, as an introduction, to become a very useful one; rather it undoubtedly *is*, as pointing in a wholly desirable direction, one of the very best on the market.

GEORGE REBEC.

SCIENTIFIC JOURNALS AND ARTICLES.

THE *Journal of Geology*, February–March, 1899. The first paper is by Henry S. Washington, and is the third installment of the series relating to 'The Petrographical Province of Essex County, Mass.,' pp. 105–122. Dr. Washington treats of the rocks occurring in dikes, viz: Aplite, quartz-syenite-porphyry, paisanite, sölvsbergite and tinguaite. The series is to be continued. B. Shimek, 'The Distribution of Loess Fossils,' pp. 122–141. The author emphasizes certain important points in the character and distribution of the fossil shells found in the loess, basing his conclusions on facts observed in connection with existing land shells. His observations confirm the Æolian origin of the Western loess. H. W. Turner, 'Granitic Rocks of the Sierra Nevada,' pp. 141–163. This is an important addition to our knowledge of the general petrography of the granitoid rocks of the Sierras. Types embracing true granites, grano-diorites, quartz-monzonites, soda-aplites, quartz-diorite-aplites and pegmatites we described with many analysis. Under the studies for students the development and geological relations of the mammalia are outlined by E. C. Case. Editorials and a valuable summary of 'Current Pre-Cambian Literature,' by C. K. Leith, close the number. The latter contributions are particularly to be commended,