As regards the translation, Professor Titchener deserves the thanks of English readers for giving them a good idiomatic version of this valuable book. A translation is always easy to criticise, and this one is not free from faults. The rendering is very free, so that in some cases the author's meaning is changed somewhat, and occasionally what is clear in the original is confused in the translation. The translator has made a special study of the English equivalents of German psychological terms and his choices are for the most part good. But his preference for Latin forms produces a somewhat dry and scholastic effect, which makes the English less attractive than it would be with more Saxon forms. 'Colligation' for 'Verknüpfung,' 'limen,' for 'Schwelle,' 'replica' for 'Wiedergabe,' 'limits of stimulability' for 'Reizgrenzen,' 'multeity' for 'Vielheit,' 'modal sensitivity' for 'Sinnesempfindlichkeit' and 'memorial image' for 'Erinnerungsbild' are examples. 'Local signature' for what the translator calls the 'collective' use of 'Localzeichen' is perhaps the worst, although it seems a pity to translate the expression 'Schwelle' by the word 'limen,' when we have a perfect English equivalent.

In its mechanical aspect this book is a sad commentary on English and American book-making as compared with German. The German book is compact, well bound, clearly printed on cream paper, and lies open at any page upon your table. The English book is spongy, loose jointed, printed upon glaring white paper with typographical errors, and yet refuses to be read unless held open by brute force.

UNIVERSITY OF IOWA. G. T. W. PATRICK.

The Number Concept: Its Origin and Development. New York and London. Macmillan & Co., 1896. ($2.00.) By LEVI L. CONANT, PH. D.

Only one exception can be taken to this book—as to its title. The book is not upon the origin of the number concept nor yet upon its development. The book deals with primitive methods of counting and with modes of expressing or registering the results of such counting. The true title would be: 'Numeral Systems (or Number Words), Their Origins and Various Forms.' Since the work actually undertaken is thoroughly and accurately carried out, this matter of title is, perhaps, of little account; yet one who approaches the book expecting to have light thrown upon the psychology of the numerical idea will be struck by the discrepancy between the title and the contents.

This discrepancy is worth insisting upon, because there is possible a psychological inquiry upon an anthropological basis which would agree with the title. The author insists (on pages 2–4) that the question of the origin of number is outside the limits of inquiry, with his title page still staring him in the face! "Philosophers have endeavored to establish certain propositions concerning this subject, but, as might have been expected, have failed to reach any common ground." The context shows that Dr. Conant understands by this subject the old controversy as to whether numerical judgments are *a priori* or the result of experience. He is quite right in ruling out this topic from an anthropological investigation, and confining himself to the simple statement that all primitive societies reveal that they have some, however crude, sense of number. But this is not the point from which the psychologist is interested in the problem. The sense of number is a historical, an evolutionary development. It arises in the race and in the individual. The psychological (and the pedagogical) problem is: Under what circumstances, in response to what stimuli or needs, in what psychical context, does this sense arise? It would be impossible to say, in advance, just how much light anthropological investigation would throw upon this problem; but it may safely be said that it will throw some light; and it is a pity that Dr. Conant, through confusing the metaphysical and the psychological problems of origin, should not have contributed what his learning and thorough research fit him to contribute. The book would then have been as useful to the psychologist as it now is to the philologist.

The following points of psychological interest may be gleaned from the philological data: 1. The numerical systems are *rythmical*. The count proceeds up to a certain point (sometimes only 2; sometimes 3, joints of a finger; sometimes 5, fingers of one hand; sometimes 10, both hands; sometimes 20, fingers and toes; then a knot is tied, a notch cut, etc., and the count repeated. With further developments, compound words are formed, making it possible to dispense, more or less, with the notch or knot, a definite base of reference being formed. 2. While the origin of many number names is from the fingers, many denote *activities* performed upon the fingers. For example, 1 may mean 'used to start with,' or 'the end is bent.' 3. The rhythms of the system show reference *ahead* and also *backwards*. For example, 9 may mean 'almost done,' 'that which has not its 10,' 'there is still one more,' 'hand next to complete,' 'keep back one finger,' etc. The reference to the starting point, however, is much more common. 9 will more often mean '4 of the *other* hand,' or 'hand with 4'

or 'end and 4.' It is undoubtedly true, as Dr. Conant remarks (p. 72,) that the savage does not discriminate the numerical idea from the concrete image of fingers or whatever with which it is bound up, *i. e.*, does not consciously abstract. But it is equally true that this continual thought of reference forwards or backwards in the larger number, is, psychologically considered, an abstracting movement. When, for instance, in the Zuni scale, 3 means 'the equally dividing finger,' instead of simply the biggest finger, it must be acknowledged that abstraction is pretty well along. While it is not true to the same extent of the verbal form in which 6 means '1 on the other,' still the element of relation is obviously prominent in the latter. While a careful study of the actual circumstances under which savages use number would be necessary to justify the statement that the ratio element in number early comes to consciousness, the philological material collected by Dr. Conant points in that direction. 4. The fact that the "student is struck with the prevalence of the dual number" in the grammatical structure of the earlier languages is an important fact. Mind first dichotomizes the universe; the world is 'this and that,' 'this' and 'the other one.' Observations which I have made on such small children as have come within my scope bear out this principle for the individual. There was not, at first (with these children at least), a plural number, but conscious selection or preference. 2 denoted not a couple, but a contrast, something left out or ruled out. 2 was not used in an aggregative or enumerative sense until an effort was made also to recognize aggregates larger than 2, which at first (agreeing here also with the philological record) took the form of 'a lot'—many. I cannot, however, agree with Dr. Conant that the difficulty which the savage met in attempting 'to pass beyond 2, and to count 3, 4, 5, is, of course, but slight.' On the contrary, it seems to me the *essential* difficulty, marking a distinct advance in consciousness. It is one thing to mark off the mental universe into this and not this; it is quite another to assume the attitude of *ordering* things within the universe, and this is what occurs when numbers develop into a row or sequence. At all events, in the observation of children just referred to, I found that the attaching of any meaning to 3 was a much later accomplishment (often a year intervening) than in the case of 2; and that when the idea of 3 was grasped there was no difficulty in getting the child to count intelligently to 10; thus indicating that the idea of 3 is not simply cumulative, but marks a different psychical attitude. Till a child can grasp the idea of 3, numbers like 3, 4, 5, etc., are taken by him to be the absolute names of certain individuals

An incidental psychological contribution, which will not fail of catching the attention of those psychologists and sociologists who are dwelling upon the importance of imitation, is found on p. 11. Experiments were made upon five different primary rooms in Worcester, Mass., to determine the 'natural' place of beginning in counting off on the finger. In two cases the teacher allowed one child to count while the other children watched. In both cases every other child followed exactly the example of the leader.

It is to be hoped that Dr. Conant, or some other equally competent student, will supplement this book with another, in which the anthropological data concerning the circumstances and motives with relation to which savages count will be collected so as to extend and to justify the philological data and conclusions; and will also take up the matter of systems of *measurement*, upon both a philological and anthropological basis. In this case the contributions to psychology will be direct and not simply incidental. JOHN DEWEY.

UNIVERSITY OF CHICAGO.

Die Spiele der Thiere. KARL GROOS. Jena, Gustav Fischer. 1896. Pp. xvi+359.

When it is learned that the above is a volume of 340 pages, exclusive of an excellent index, it will at once be plain that the treatmen[t] of the subject is of the most thorough kind.

The book is well printed on good paper and with a type that encourages one to keep on when once he has begun the reading—a very important matter in a work which is, after all, of special rather than general interest. In the introduction a succinct statement of the author's entire position is given. The work is rendered valuable for reference by reason of a very full bibliography.

The subjects of the different chapters are as follows:

I. Consideration of the theory that play is an expression of excess or overflow of energy.

II. Play and Instinct.

III. Forms of Play among Animals, which is continued in a fourth chapter as 'Die Liebesspiele,' the two together making over 200 pages of matter.

V. The Psychology of Animal Play.

The author gives the most ample evidence of familiarity with the literature that bears on his subject, whether directly or indirectly, and well-known American writers on psychology are quoted again and again, some of the citations indicating that the writer appreciates not