foresees and judges to be advantageous (p. 237). The human intellect is the great source of telic activity (p. 245).

We fully endorse this view of social evolution, which is, in the main lines, in accord with the results of the most recent investigations (Tarde, Baldwin, Giddings, Barth, Stein). But we must call attention to the fact that Dr. Ward's suggestive theory of social telesis cannot acquire a definite meaning if not interpreted in the light of the Imitation-theory. How does invention, *i. e.*, the normal result of telic activity, act upon the social milieu, thus becoming a 'cause' of transformation of the social conditions? In other words, what is the way of propagation of the typical social force, of the dynamic agent, desire, motive, will power? Dr. Ward is silent on this point. Here, evidently, the leading-string is the Imitation-theory, which once more appears to be the corner-stone of sociology.

In conclusion, Dr. Ward's book is a very valuable work, which will undoubtedly contribute to clear the way of the cumbersome remains of the 'biologic' analogies, thus securing the predominance of the psychological interpretation of society, owing to which the shapeless embryo of science, or, rather, the reservoir of 'mauvaise littérature,' known for so long as Sociology, is gradually being changed into a body of knowledge exhibiting some of the characteristic attributes of science.

Gustavo Tosti.

The Instincts and Habits of the Solitary Wasps. By Geo. W. and Elizabeth G. Peckham. Published by the State of Wisconsin. 1898. Pp. 245. Pls. xiv.

It is not too much to say that this work will be regarded as a classic, not only on account of its scientific value, but also as literature. It has all the lucidity and charm that we are accustomed to associate with Gallic genius, while at the same time its exactness in detail would do credit to a German professor. It is a book of incalculable educational value, for it not only exhibits the delights of intelligent nature study, but shows what admirable work may still be done, in any garden in the country, by persons of either sex and almost any age beyond childhood. It does not lay stress on laboratories or apparatus, nor does it demand the outlay of money; those who would follow in the footsteps of our authors have only to exercise those faculties provided them by nature, and, if they have it in them to succeed, success will be theirs.

But let it not be imagined that the work is easy or simple. There is scope for intellectual exercise to the utmost limit, while physical endurance and patience are essential. Think of the mental attitude of some being from Mars who should be placed in a position to observe the doings in a busy city on this earth. How extraordinary, how inexplicable, would some of our most simple and every-day proceedings appear! How wild would be his guesses as to the meaning of this or that! Yet the student of insect psychology is hardly in a more favorable position, and it requires the closest attention and keenest wit to avoid gross errors of judgment. This is well seen in the fact that our present authors have to correct even the accomplished and painstaking Fabre in many of his important conclusions.

Then as to physical endurance; our authors watched their wasps throughout the long hours of the summer days, and sometimes far into the night. When studying *Ammophila* they write: "For a whole week of scorching summer weather we lived in the bean patch, scorning fatigue. We quoted to each other the example of Fabre's daughter Claire, whose determination to solve the problem of *Odynrus* led to a sunstroke. We followed scores of wasps as they hunted; we ran, we threw ourselves upon the ground, we scrambled along on our hands and knees, in desperate endeavors to keep them in view, and yet they escaped us. After we had kept one in sight for an hour or more some sudden flight would carry her far away and all our labor was lost. At last, however, our day came. We were doing a little hunting on our own account, hoping to find some larvæ which we could drop in view of the wasps and thus lead them to display their powers, when we saw an *urnaria* fly up from the ground to the underside of a bean leaf and knock down a small green caterpillar. Breathless with an excitement which will be understood by those who have tasted the joy of such a moment, we hung over the actors in our little

drama. The ground was bare; we were close by and could see every motion distinctly. Nothing more perfect could have been desired." For what followed we can only refer the reader to the book itself, wherein is told even how *Ammophila* used a tool in perfecting her nest.

In the concluding chapter the authors write: "Our study of the activities of wasps has satisfied us that it is impracticable to classify them in any simple way. The old notion that the acts of bees, wasps and ants were all varying forms of instinct is no longer tenable and must give way to a more philosophical view. It would appear to be quite certain that there are not only instinctive acts, but acts of intelligence as well, and a third variety also—acts that are probably due to imitation, although whether much or little intelligence accompanies this imitation is admittedly difficult to determine. Again, acts that are instinctive in one species may be intelligent in another, and we may even assert that there is considerable variation in the amount of intelligence displayed by different individuals of the same species."

The fact of great individual psychological variation is very clearly demonstrated throughout the book; but, since all the observations were made in the same immediate vicinity, it has not been possible to determine whether there exist psychological races among wasps, as among ourselves. It will remain for other observers to repeat the work of the Peckhams in many different localities, and see how far each species is constant over a wide range. There can be little doubt that variations in habits, to suit different environments, are much more common than we know; and it is also evident that psychological and physiological variations, not necessarily accompanied by gross morphological changes, must have a great deal to do with the manner and progress of evolution. Comparative studies in different localities may also explain habits which, studied in one place only, seem useless. Thus the Peckhams cannot explain why *Bembex* is so careful to hide the entrance of her nest, since in the case of the colony studied (on an island) there is apparently no enemy to be guarded against in this manner. It might prove, by studies elsewhere, that this was a device to conceal the nests from nocturnal mice or some other enemy of which we know nothing.

T. D. A. COCKERELL.

MESILLA PARK, N. M., November 10, 1898.

Four-footed Americans and their Kin. By MABEL OSGOOD WRIGHT. Edited by FRANK M. CHAPMAN. With 73 illustrations by ERNEST SETON THOMPSON. New York, The Macmillan Co. 1898. Pp. 432. Price, $1.50.

Among the many popular books on natural history that have appeared recently, very few have treated of mammals and none have been devoted exclusively to them. It is, therefore, gratifying to find in 'Four-footed Americans' an attractive, well-illustrated volume containing accounts of common North American mammals —accounts which, though primarily intended for children, must prove interesting and instructive to older persons.

The book is planned after the manner of 'Citizen Bird,'* by the same author, and is evidently intended as a companion volume. As in 'Citizen Bird,' the descriptions and life histories are presented by interesting characters in the form of stories, which, though not always spiced with adventure, are well calculated to attract young minds and create a wholesome interest in the animals for their own sakes. The spirit of the title is maintained throughout; it is emphatically American — an exceedingly creditable feature. In a household where such a book finds a place children are sure to grow up knowing and loving the animals of their own country.

The book closes with a 'Ladder for climbing the Family Tree of the North American Mammals' (presumably by the editor), which is an abridged and adapted classification, giving a few characters for the larger groups and indicating approximately the number of species of each family. In the few pages devoted to this 'Ladder' errors in typography and nomenclature are not infrequent. Conspicuous among these are the use of *Manatus* instead of *Trichechus*, *Dicotyles* instead of *Tayassu*, *Dorcelaphus* for *Odocoileus* and *Alces alces* for *Alces americanus*. Inaccuracies in the text, also apparently overlooked by the editor, are the statements

* Reviewed in SCIENCE, November 5, 1897, p. 706.