

choice really unfairly predetermined and so deceptive. If, he thinks, the supernatural powers let us alone to choose for ourselves, then our inductions, properly guarded, will inevitably lead us in the direction of true conclusions, whatever the arrangement of the real world. But has Mr. Peirce made all the necessary admissions? Would a devil be needed to confuse my efforts at sampling, so as to make my choice unfair? Would not an instinctive interest in one class of cases serve to vitiate the fairness of my observations in cases where this instinct controlled me? Suppose that by instinct I took such interest in the cases of M's that are P that I noticed no cases, or very few cases, of M's that are not P, however many there might actually be: then, unless I were conscious of this instinctive preference, I should go on neglecting numberless cases that I ought to have taken into account in forming my induction; and yet, not knowing my own natural defect, I should think that I was choosing my cases wholly at random. Here would be a constant error in the process, whose magnitude might be enormous. Yet the error could never be discovered, save by some one to whom a new mental growth made possible the discovery of the instinct. But this case is no factitious one. Our observation of nature is doubtless determined throughout by our natural interests in things. These interests are instinctive, and they may exclude from the very possibility of notice very many facts. Thus, a person that by nature is indisposed to notice the double images in the binocular visual field will study his field of vision for a long time, and will assure you that there is no doubleness there. Might he not say, that after making at random many trials, and finding no double images, he was warranted in the conclusion that for him the proportion of double images in the visual field must be extremely small? Yet once begin to notice the doubleness, and the double images will be found in multitudes, like the chariots and horses that Elisha's servant saw when his eyes were 'opened.'

When we conclude that continuous random sampling of a given natural class must lead us towards discovering the true proportion of cases of the presence of a predesignated character in individuals of the class, must we not base our conclusion on the ultimate *a priori* assumption that our instinctive tendencies to observe natural facts are such as, in the long-run, will lead us to actual choice at random, and not to a choice unconsciously vitiated by unknown preferences for cases that favor the

conclusion that we reach? And is not induction, therefore, still dependent on an *a priori* assumption about the nature of reality? 318

But these inadequate negative suggestions must not give the impression that the foregoing is the whole substance of this very compact essay, which is full of valuable thoughts upon scientific method, and which must be read in detail to be appreciated. We hope for much more such work as this book contains, for the result cannot fail to be of value alike to American science and to American philosophy. Those who oppose a purely empirical philosophy must still be aided by finding so able a defence of some of its doctrines, and those who believe in other forms of logical doctrine cannot afford to remain ignorant of the advances of symbolic logic.

#### THE RACES OF MEN.

*Les races humaines.* Par ABEL HOVELACQUE, professeur à l'École d'anthropologie. Paris, Cerf, 1882. 159 p., illustr. 16°.

This rather attractive work is written on a practical plan, which is specially useful in tending to correct the false impressions generally entertained, connected with the term 'race.' It is strictly limited to ethnography as distinguished from ethnogeny and ethnology, and simply considers the actual divisions of mankind, with their geographical areas, and their physical, intellectual, and moral characteristics. In the classification of races, the old division by color—as white, yellow, black, etc.—is repudiated; the fact being established, that other characteristics, such as those relating to the hair, to the shape of the cranium, and to height, are equally important, and that none of them can be exclusively adopted in class arrangement. Failure likewise attends a merely linguistic and a strictly geographical grouping. The attempt to discuss races in the order of their development toward civilization would seem to be philosophic, but meets with the difficulty that bodies of men, who, by all other considerations are to be included in the same race, are at wholly diverse degrees of progress in civilization. Admitting, therefore, that no single criterion is possible, the author decided to take account, with due weight, of all the different elements of classification, and to leave to the presentation itself, by its success, the responsibility of justifying its own order.

Professor Hovelacque's arrangement, as distinguished from strict classification, is as follows: 1. Australians; 2. Papuans; 3. Mela-

nesians; 4. Bushmen; 5. Hottentots; 6. Negroes of Soudan and Guinea; 7. Akkas; 8. Kafirs; 9. Nubas; 10. Pouls (Foulas or Fellatas); 11. Negritos; 12. Veddahs; 13. Dravidians; 14. Mundas (Kohls and Kolarians); 15. Indo-Chinese; 16. Siamese; 17. Birmese; 18. Himalayans, including Thibetans; 19. Annamites; 20. Cambodgans; 21. Chinese; 22. Japanese; 23. Ainos; 24. Hyperboreans; 25. Mongols; 26. Malays; 27. Polynesians; 28. Americans; 29. Caucasians, including Circassians, Georgians, etc.; 30. Berbers; 31. Semites; 32. Asiatic Aryans; 33. Occidentals or Indo-Europeans.

The author expressly states that his intention has been to devote much more space to the inferior than to the superior divisions of men, and to treat with detail only of those less known. As he allots only five pages out of the one hundred and fifty-six of the volume to the North-American Indians, he must consider them to be 'superior,' and well understood. But they are not apparently thoroughly understood by him. His enumeration, not only of tribes, but of the most important linguistic stocks, is imperfect and inaccurate. He is wildly at fault in many of his generalizations, some of which it seems proper to correct. The Indian is said to dwell in miserable huts made of poles united in a cone and covered with skin. It is true that the conical form of temporary lodges prevailed from obvious circumstances; but the material for covering was much more frequently of bark and mats than of skins; and the more permanent dwellings were of various styles and materials, in which neither poles nor skins appeared, and were often comfortable. The statement is distinctly made, that each family lived in its own particular hut or cabin. The rule is almost without exception, that, apart from the temporary lodges, all dwellings were adapted to the living-together of several families: in other words, they were communal. Furthermore, the error is repeated, that the Indians subsisted almost entirely on the products of the chase, supplemented only by such vegetables as were the spontaneous productions of nature, all cultivation of the earth being despised. The fact is, that every tribe east of the Mississippi and between the St. Lawrence and the Gulf of Mexico cultivated the soil sufficiently to derive an important part of its subsistence therefrom. In general it may be remarked of the author's statements regarding the North-American Indians, that, when true at all, they are true only of particular tribes, and are not of wide application. In this he has merely travelled

in the path of other European writers who have regarded these people as of a single homogeneous race; whereas by the criteria of language, physical characteristics, environment, etc., used for other parts of the world, there would be as much propriety in his dividing the North-American stocks as in several of the other divisions above quoted. When, moreover, he lumps the Indians of North and South America together, he does little better and is less candid than the old geographers, who labelled a fancied line 'terra incognita.'

#### GAGE'S ELEMENTS OF PHYSICS.

*A text-book of the elements of physics, for high schools and academies.* By ALFRED P. GAGE, A.M. Boston, Ginn, Heath, & Co., 1883. 10+414 p. 12°.

BECAUSE we find lightning explained as the thunder-bolts of Jove, forged by Vulcan, remembering that this was no poetical idea, but the actual belief of a simple folk; because the Indians explain the setting of the sun by saying that it has burrowed into the earth; because such gross explanations satisfy the mind not yet developed,—should we in our teaching, that our knowledge may appear the more complete, make use of such false fancies?

Many teachers find it of supposed advantage to make use of the atomic theory in explaining solution, expansion, or the fact of smell. This gives, it is true, a clear picture of a possible mechanism. But is there not a danger, when the slender grounds there are for proof of such suppositions are found out, that the student may turn away, feeling that the whole structure of physics is built upon such conceits?

There is the satisfaction of a clear picture, which can be understood and compared with more tangible phenomena. But is not this a loss, when obtained at the expense of bringing in a conception of matter for which there are reasons, but reasons of a nature which cannot be appreciated by the beginner?

This prominence of atoms is an old bugbear of elementary text-books. Yet our knowledge in regard to them only dates from ten or twenty years ago, or, as Thomson would have it, from the work of Caudey on the dispersion of light. To be sure, the word 'atom' may be found in many a metaphysical discussion; but how could such wranglers, switching at phantoms, be expected to hit so small a thing?

It would seem safer to leave the causes of the general properties of matter as entirely unknown. When the child asks what becomes