

one or the other of these two things, but cannot be both at the same time. Perhaps the latter interpretation is the nearest to truth. The expansion of Catholicism in England within the last fifty years is evidently related to the undercurrent of mystical tendencies which has been pushing Saxon art towards archaic forms. But, as far as this country is concerned, the growth of Catholicism is dependent upon increase in immigration from Catholic countries, a factor which has been somewhat underestimated by Mosso.

In the following chapters—V., 'The Weakness of Religious Feeling,' VI., 'The Protestant Universities,' VII., 'The Catholic Universities and Canada,' VIII., 'Americanism,' IX., 'Modern Tendencies in Education'—Mosso takes up the different aspects of the problem upon which his interest is mainly centered, *i. e.*, the problem of the relation that democracy bears to religion and education. Particularly worthy of mention are the chapter on 'Americanism,' which gives a very clear account of the controversy waged between the Roman Curia and some prominent representatives of Catholicism in this country, and those in which he describes the peculiarities of American university life. Chapter X.—'The Crowd and the New Aristocracy'—is a study of American political life as influenced by the formation of a powerful aristocracy of millionaires. The tenth chapter, on 'Primitive America,' is a hymn to nature. It is a vigorous description of some of the most picturesque aspects of this continent, in its wildest regions, where civilization has not yet spoiled the divine charm of an enchanting nature. Here Mosso shows his decided literary tastes, and some of his pages are really beautiful.

On the whole, Mosso's book will prove both interesting and instructive to his own compatriots as throwing a fuller light upon this wonderfully growing country, which is called to play such a tremendous rôle in the drama of the century. While to the American reader who can afford to take hold of this charming book, it will undoubtedly be a source of deep gratification to see how the noble efforts of this valiant race towards a high ideal of civilization are appreciated by a scholar and a scientist of Mosso's standing and fame.

GUSTAVO TOSTI.

*Atoms and Energies.* By D. A. MURRAY, with an introduction by PROFESSOR FREDERICK STARR, of the University of Chicago. New York, A. S. Barnes & Co. 1901.

"It is a long time since I have read a work in physical science which has given me so much pleasure as '*Atoms and Energies*.' The subject is interesting, the point of view novel, the argument clear, the book itself satisfactory."—Professor Starr.

In writing this short review our chief aim is to make reply to Professor Starr, for we too have been trying to interest him and others not specially devoted to the subject in physical science.

From the contents of the little book before us it appears that the author knows nothing of the works of the great builders of that marvelous Engine of Interpretation, the atomic theory. Among these works may be mentioned the following, each of which is monumental in character. The list will serve to indicate to the reader the present scope of the atomic theory. Maxwell's and Boltzmann's contributions to the 'Kinetic Theory of Gases,' Sohncke's 'Theory of Crystal Structure,' Poisson's contributions to the 'Molecular Theory of Elasticity,' van't Hoff's 'Stereo-chemistry,' Planck's 'Electro-atomic Theory of Radiation,' and J. J. Thomson's 'Corpuscular Theory of the Electric Discharge,' to say nothing of such works as Johnstone Stoney's on 'The Electron Theory,' and Lord Kelvin's on 'The Vortex-atom Theory,' both of which are devoted to 'many an assumption that is not exactly necessary,' to use Helmholtz's words, which are quoted in the next paragraph.

What are atoms? we are inclined to ask when we take up Mr. Murray's book, although under ordinary circumstances the question does not much concern us. In so far as we have anything to do with them we believe they are mere logical constructions. Bacon long ago listed in his quaint way the things which seemed to him needful for the Advancement of Learning. Among other things he mentioned 'A New Engine or a help to the mind as a tool is a help to the hand,' and the greatest achievement of the nineteenth century in physical science is the realization of Bacon's idea, in a great body of useful theory. As Helmholtz

says: "It is a great advantage for the sure understanding of abstractions if one seeks to make of them the most concrete picture possible, even when the doing so brings in many an assumption that is not exactly necessary." Just how much of this useful theory is to become the common property of all men it is impossible to say. For one thing, the theory is not by any means fixed and may not be for a century to come, and no one but the most determined specialist can be expected to appropriate and use the more complex theories which depend upon the keenest mechanical sense, the sharpest algebraic faculty, the strongest geometrical imagination and the most devoted study; but there is a great and growing body of simple conception and theory which can and does represent to the understanding a vast array of fact. Every one should know that the physicist's idea of a thing such as a gas, an electric current, or a beam of light comes very near to being a working model of the thing. The elements out of which such models are made are purely notional, and although the physicist habitually speaks of them in objective terms for the sake of concreteness and clearness, it is of the utmost importance that the thought be chiefly directed to the physical facts which are represented and not to the models themselves. Thus the chemist may speak of the tetrahedral carbon molecule with assymmetrically attached molecular groups, while the thought is directed chiefly to those remarkable physical properties of sugar and tartaric acid which are intended to be represented.

There is a tendency among reflecting men to confuse the boundaries between our logical constructions and the objective realms which they represent to the understanding. In fact, Münsterberg maintains that this confusion is the gravest danger of our time. It seems to us that these logical constructions constitute the noxious gases mentioned by Professor Woodrow Wilson as escaping from our laboratories, and that they become noxious by confusion and misuse. The old idolatry is the worship of external form—imagine a remote ancestor worship fully contemplating the newly invented club instead of using it—and the new is the con-

templation of our logical constructions in an aspect in which they are not real, a vaporous idolatry which is rightfully prevalent.

We are impressed more and more every day with the fact that the most satisfactory specialist to talk with is the biologist. His knowledge is not represented to his mind by means of that mathematical-mechanical system of conceptions which is the basis of all our knowledge in physical science, but it approaches art in its close association with external form. Conversation with a physicist, however, is very like looking into the mechanism of a Mergenthaler type-casting machine with the machine out of sight, feasible enough among designers and builders, but scarcely a satisfactory basis for the flow of thought when one party in the conversation happens to be unfamiliar with and perhaps not interested in the mechanism in question. Nevertheless a seriously minded physicist cannot help feeling mortified when he sees a colleague of Professor Starr's standing examining a more or less fanciful, inoperative, and obsolete pea-shooter with the pleasurable conviction that he is unraveling the intricacies of a complicated mechanism of the latest and most approved construction.

W. S. FRANKLIN.

#### SCIENTIFIC JOURNALS AND ARTICLES.

THE *American Anthropologist* for April-June, which has just reached us, contains the following articles:

'The Owaküiti Altar at Sichomovi Pueblo': J. WALTER FEWKES.

'Chalchihuitl in Ancient Mexico': ZELIA NUTTALL.

'Notes on the Alsea Indians of Oregon': LIVINGSTON FARRAND.

'Kootenay Group-drawings': ALEXANDER F. CHAMBERLAIN.

'Ethnology in the Jesuit Relations': JOSEPH D. MCGUIRE.

'Rare Books relating to the American Indians': AINSWORTH R. SPOFFORD.

'Summary of the Archeology of Saginaw Valley, Michigan': HARLAN I. SMITH.

'Mummification, especially of the Brain': D. S. LAMB.

'Decorative Symbolism of the Arapaho' (with plates V. and VI.): A. L. KROEBER.