them possible with pigments, and applying these to the Maxwell rotating disks, with the addition of black and white, we can make and accurately name a very large proportion of all the colors found in nature which also agree somewhat nearly with similar pigmentary compositions.

As above stated, this system of color instruction includes a practical nomenclature of color never before advanced, which has already been explained by Professor Pillsbury. Professor A. H. Church of the Royal Academy of Arts, in a series of lectures before the Society of Arts, London, an account of which has been published in this country, urges a scientific consideration of color in its application to art, and near the close of one of his lectures he says :—

"We want an international color conference, in which artists, manufacturers, and scientists shall be represented. We want an agreement upon the name to be assigned to a number of different hues. We want representations of these hues reproduced in enamel, preserved like our standards of weights and measures, and distributed to every educational institution in the United Kingdom. . . . The importance of having a definite nomenclature of quite intelligible character at our disposal when we are talking or writing about the decorative employment of color is so important that I venture to make a few suggestions which may tend toward the attainment of this object."

After making a suggestion for a method of notation, Professor Church adds: —

"The corresponding modifications in the five other principal series of colors would be expressed in a similar manner, the symbols, etc., being used exactly in the same way as in chemical notation. In order to obtain a scale in a concrete form I would recommend the use of Maxwell's rotation method by which each step in the gradation could be matched."

This author next proceeds to give a nomenclature of colors, but as it is based on the three primary colors of the scientist, namely, red, green, and violet, and the introduction with them of such additional terms as sea-green for a symbol, it is neither as simple nor as definite as the one which has been described in your article to which I have referred. This nomenclature is based solely on nature's standards as found in the solar spectrum. Should we be favored with the international conference suggested by Professor Church, and should such a conference adopt the six standards and definitely locate them in the spectrum by their wave lengths, the world would then have standards which are the same in one country as in another, and would remain the same in the twentieth century as in the nineteenth.

As a manufacturer of an extended line of colored papers I am constantly putting this proposed nomenclature to a severe test by ordering new colors by telephone. That is to say, we make the desired combinations on the wheel in our office and then telephone them to the factory, ten miles distant, where they are again made on the wheel and the papers are then manufactured to correspond with the results of these combinations. Under this plan we are liable to have occasion to "telephone a color" frequently. In the same way we could cable colors to Europe should it be necessary. MILTON BRADLEY.

Springfield, Mass., March 17.

Professor Alexander Agassiz on the Origin of the Fauna and Flora of the Galapagos Islands.

IN the "General Sketch of the Expedition of the 'Albatross' from February to May, 1891" (Bull. Mus. Comp., Zool., Harvard College, Vol. xxiii., No. 1, Cambridge, Feb., 1892) Professor Alexander Agassiz refers to my paper "On the Origin of the Galapagos Islands" (*Am. Nat.*, March–April, 1891). There are some fundamental misunderstandings of my statements in Professor Agassiz's remarks, which need correction.

Page 71, he says: "He [Baur] speaks of the Galapagos as being connected with the mainland by the 4,000-meter line." Then he adds "This [the connection of the Galapagos with South America] is an important fact; all the older maps showed the Galapagos separated from Central America" (!). To this I have to reply, that I never expressed the opinion that the Galapagos were formerly connected with South America. The same is repeated by Professor Agassiz in two other passages (p. 71).

In all my statements in regard to the land connections I was very cautious, as will be seen from p. 310: "*In their general characters the fuana and flora of the Galapagos show resemblances to the great Mexican and Sonoran province, and also to the West Indies, and it may be that the connection was with these regions (and it seems more probable than any other), but of course it is quite impossible to bring to-day any positive proof for this idea.*" (The italics are mine.)

According to Professor Agassiz the proof of my subsidence theory "is based on no better evidence than the so-called alpine character of parts of the flora and upon the presumed former connection of the Galapagos Islands with the Central American continent." Professor Agassiz has completely overlooked the main point of my argument. This I considered the harmony in the distribution of fauna and flora, as will be seen by referring to my paper. I tried to show that this harmony was absolutely unexplainable by the theory of elevation. After this was done, I examined whether our present knowledge of the soundings showed any serious obstacle to the theory of subsidence, and I found that it did not. *Professor Agassiz did not refer with one word to this harmony of distribution, which formed the basis of my whole ideas!*

When Professor Agassiz or any one else is able to explain this by the elevation theory, I shall be the first one to adopt it. But until this has been done, I believe in subsidence.

The paper to which Professor Agassiz refers was written before my visit to the islands. My investigations have only more convinced me of the insufficiency of the elevation theory. In my final work I shall speak fully about this question and about other points in Professor Agassiz's article. G. BAUR.

Clark University, Worcester, Mass., March 15.

The Scientific Alliance.

I HEARTILY agree with your leading article of March 11, and trust that you will continue to press this subject. The further co-operation of the scientific societies in this city will result, I feel confident, in increased activity and effectiveness in each.

The special needs of many branches of work now being carried on here are more funds for publication and for first-class illustration. There is no national publication open to all papers of merit, like the Royal Society Transactions. The only journal I know of which provides liberally for illustration is Whitman and Allis's *Journal of Morphology*, and this is now, I have learned, overstocked for two years to come with biological papers of a high class. HENRY F. OSBORN.

Biol. Dept., Columbia College, March 18.

BOOK-REVIEWS.

Travels amongst the Great Andes of the Equator. By EDWARD WHYMPER. New York, Scribner's. 8°. $6.

AMONG the fascinating books of Professor Tyndall's is one on "Hours of Exercise in the Alps," in which, among other matter, he records the several unsuccessful attempts he made to ascend the Matterhorn, and how the rope left, by his party, hanging over a ridge of rocks enabled the next following party of climbers headed by Edward Whymper to gain such advantage as to be able to reach the top. This first success was marred by a terrible tragedy, only three or four of the party of seven getting back to the foot of the mountain alive.

But Edward Whymper added another triumph to his record as a mountain climber in his being the first to reach the summit of Chimborazo in 1879. It is the account of his journey at that time that is now published.

A hundred years ago the natives of the valley of Chamonix who took travellers up the mountain suffered as much as their employers from physical sensations ascribed, no doubt rightly, to the rarity of the air. They were unable to walk more than a few paces without halting. Last autumn travellers who walked in early morning from the hut under the Bosses (14,000 feet) to the top (15,780 feet) had the company of five Chamoniards. They

went up at a fair pace without resting. Arrived on the top, without a moment's pause, the men took their spades and shovels and began digging. They asserted that they did only about a third less work in the day than in the valley; and that they suffered no inconvenience from a prolonged stay in the Bosses hut; slept well, and ate largely. Their work was to excavate a tunnel in the summit ridge about thirty feet below the top. The object of this tunnel was to reach rock, in which a shelter-cave might be excavated.

Mountain-sickness is a term which has been used during the nineteenth century to designate the ailments which come to men and beasts on reaching high elevations on mountains. Some supposed that the uncomfortable symptoms were the result of local causes, and did not depend solely on reduced atmospheric pressures, as is the opinion of Mr. Whymper.

It was largely with a view to settle various questions in regard to mountain-sickness that the journey to the Andes was undertaken. Mr. Whymper wished to learn: (1) at what pressure the symptoms would first appear; (2) what form the sickness would take; (3) whether one could become habituated to low pressures.

To the first question the answer came at a pressure of 16.5 inches. Most of the party were simultaneously incapacitated for work and found themselves preoccupied by the paramount necessity of obtaining air. Precautions had been taken not to introduce complications in the way of physical exhaustion, Mr. Whymper maintaining "that our 'incapacity' was due neither to exhaustion nor to deficiency of bodily strength, nor to weakness from want of food, but was caused by the whole of our attention being taken up in efforts to get air." This gasping for air was accompanied with intense headache and an indescribable feeling of illness, pervading the whole body. The attack was sudden, but the recovery gradual; and even at the best it was only while at rest that sufficient air could be secured through the nostrils; on exerting themselves it was necessary to breathe through the mouth as well, and the capacity for work was low.

In reviewing the whole of their experiences, two different sets of effects could be distinguished: those which were transitory, and those which remained so long as the party was exposed to low pressures. The transitory effects were acceleration of the circulation, and increase in temperature. The permanent ones were more rapid respiration, indisposition to take food, and lessening of muscular power.

In the opinion of Mr. Whymper, the mountain-sickness is due to diminished atmospheric pressure, which operates in two ways: by lessening the value of the air inhaled, and by allowing the gases within the body to expand and seek partial escape.

But aside from the value of the book as a record of investigation on mountain-sickness, which is, by the way, made by no means prominent, we have in "Travels amongst the Great Andes of the Equator" a most valuable record of travel, well written.

A "Supplementary Appendix," to which some fifteen prominent naturalists contribute, is devoted to the collections made in the Andes, a very considerable part being on the coleoptera. The ample number of plates and illustrations make the whole work one of special value as a scientific record, and the account of the journey is most entertaining.

Order in the Physical World and its First Cause According to Modern Science. From the French. New York, James Pott & Co. 12°. $1.

Natural Law in the Spiritual World. By HENRY DRUMMOND. New York, James Pott & Co. 12°. 75 cts.

THESE two works are eminently characteristic of the present time. The relations between science and religion have been the constant theme of comment and controversy for the past thirty years, and still excite extraordinary interest in certain classes of minds. Persons of an atheistical turn point to certain discoveries and theories of science as negativing the very idea of religion; defenders of Christianity repel the charge; while a third class of writers endeavor to reconcile the two conflicting systems of thought by finding some rational ground of agreement. The two works now before us belong to this last category. The first, which is translated from an anonymous French writer, is an adaptation of the design argument to the present state of scientific knowledge; the discoveries of science themselves furnishing the basis on which the argument rests. It is not a profound work nor in any way original; and it will not satisfy minds thoroughly imbued with the skepticism so characteristic of the present time. But for those who think the design argument a convincing one the book will have an interest. Unfortunately the English of the translation is imperfect and sometimes ungrammatical, especially in the earlier pages, and typographical blunders, such as "sideral" for sidereal, "Emmerson" for Emerson, etc., are altogether too frequent.

The second volume before us is of a different character, and somewhat curious. The author, Mr. Drummond, as he tells us in his preface, had been employed for some years in teaching the natural sciences on week days and lecturing upon religious themes on Sundays. Naturally, and almost necessarily, he was led to a study of the relations between the two subjects and to seek some basis of agreement between them. The result appears in this book, in which he endeavors to show that the laws of biology, which are manifest in organic life, are no less manifest in religious, or, as he calls it, spiritual life. Analogies between organic life and the mental and moral life of man have often been pointed out before; but Mr. Drummond maintains there is something more than analogy in the case, that the very same laws operate in these widely different spheres. We cannot think, however, that he proves his thesis, the resemblances that he points out between the natural and the spiritual world being, in spite of his disclaimer, nothing but mere analogies, and often remote and fanciful analogies. For instance, he speaks of the law of biogenesis, that life can only come from antecedent life, and argues that this is the same as the Christian doctrine that a man must "be born of water and of the spirit" in order to enter the Kingdom of God. He even speaks of "spiritual protoplasm," and declares that the difference between a Christian and a good man who is not a Christian is the difference between the living and the dead. As poetic analogies between natural and spiritual things, some of the resemblances that Mr. Drummond dilates upon have a certain interest, and serve well to illustrate moral and religious truth; but as the basis of scientific doctrine and as proving the reign of law in the spiritual world, they are of little value.

AMONG THE PUBLISHERS.

THE exclusive authorization to issue an English translation of the "Memoirs of the Baron de Marbot," which have created unusual interest in Paris, has been acquired from the Baron's representatives by Longmans, Green, & Co. They will publish the work immediately, both in New York and London.

— P. Blakiston, Son, & Co. have brought out a second edition of Blair's "The Organic Analysis of Potable Waters." Considering that the first edition was published but little over a year ago, this shows that the book has proved a good one.

— Messrs. Eason & Son, Dublin, will issue in April the first number of the *Irish Naturalist*, a monthly journal of general Irish natural history, and the official organ of all the natural history Societies in Ireland. The editors will be Mr. George H. Carpenter and Mr. R. Lloyd Praeger.

— A new *Physical Review* has been started by the publisher, J. Engelhorn, of Stuttgart. The editor is L. Graetz. The object of this periodical will be to make German readers acquainted with the work being done by physicists in other countries. It is intended that it shall serve as a sort of supplement to the well-known *Annalen der Physik und Chemie*.

— W. B. Saunders, 913 Walnut Street, Philadelphia, has published, as No. 22 of Saunders's Question Compends, "Essentials of Physics," by Fred. J. Brockway, M.D. The book is arranged in the form of questions and answers prepared especially for students of medicine. The author is assistant demonstrator of anatomy at the College of Physicians and Surgeons, New York. The reasons assigned for the existence of the book are that Ganot is too large for the purposes of medical students and that some of the other text-books do not contain enough.