vegetative development and seed-production, facilitates the activation and appearance of latent qualities, and the inference lies near at hand that such conditions also participate as causes in the original organization of new unit-characters, or in changes in these entities. We conclude, therefore, that favorable environment promotes the formation of new species as suggested by Korshinsky, and that new species do not arise under the stress of infra-optimal intensities of external factors as proposed by Darwin.

Furthermore, it has been found that certain qualities arise and disappear more numerously, and presumably more readily, than others, in a mutating strain. Thus those embodied in the mutants *oblonga, lata* and *nanella* find external realization in many more individuals than those which constitute the differentiating features of *rubrinervis, scintillans, gigas, elliptica, subovata* and others.

Again, the inspection of the cultures made in Amsterdam and New York demonstrates that the last-named locality offers more favorable soil and climate for the evening-primroses. Correlated with this I am able to report that careful attention to the cultures has resulted in an increase of the proportion of mutants from the five per cent. maximum of de Vries to more than six per cent. in the last season, in the American cultures, and to say that some forms which did not reach maturity, and others which did not occur in Amsterdam, may find in New York a climate in which they may carry out their entire development. The cultures of Lamarck's evening-primrose now being carried on include fourteen recognizable mutants, and it is pertinent to state that I have mutants of other species which will be duly described after they have completed a cycle of development.

All components of the environment may not be taken to be of equal value in the induction of new qualities, and I by no means wish to give the impression that the problem is on the point of being solved, but our hopes have been raised to the highest pitch that we may soon be able to discern the factors more or less directly concerned.

To be able to bring the causes that are operative in the formation and structural expression of qualities, *i. e.*, the moving forces of evolution, within the range of experimental investigation would be a triumph worthy the best effort of the naturalist; in that it would give us the power to give new positions to qualities and thus to produce new organisms, its importance would rank well with that of any biological achievement of the last half century.

SCIENTIFIC BOOKS.

The Zoological Record, Vol. XL., being records of zoological literature relating chiefly to the year 1903. Edited (for the Zoological Society of London) by DAVID SHARP. London. 1904. [Published early in 1905.]

The Zoological Record, which has now been published for forty years, is simply invaluable to the working zoologist. This statement seems so trite as to be ridiculous, but the fact is not known to some of those who most need the work. Some time ago I received letters from a well-known naturalist, asking for information concerning a group, the North American species of which he was cataloguing. In my replies I referred to the *Zoological Record;* but the answer came back: 'Do not refer me to the *Zoological Record,* it is not accessible to me.' I do not cite this as an unusual case; on the contrary, one continually observes that writers have not seen the *Record,* and have missed various things in consequence.

Consider for a moment what a time-saver the *Record* is, and how many oversights it prevents. Suppose I want to know about some genus of animals, literally *any* genus that may be mentioned; in half an hour I can find

out what new species have been described in that genus, or important things said about it, in the last ten years. Without the *Record* I might spend days in the quest, and then not find what I wanted.

I have tried the Zurich cards (Concilium Bibliographicum), but have not found them so satisfactory. In a discussion at a meeting of the American Association for the Advancement of Science a few years ago, Professor H. B. Ward stated that for his purposes the cards were preferable to the *Record,* so one must grant that needs differ; yet I can not imagine that a taxonomic worker could do without the *Record.* The cards, as printed, do not list the species separately, although it is now possible to obtain manuscript species-cards for a small sum. Even if cards were printed for all the species, as is done for plants at the Gray Herbarium, I do not think they would be so serviceable as the pages of the *Record,* wherein the eye can pass rapidly over the names of dozens of species, without having to turn over cards. On the other hand, when one has to do with a long series of years, the advantage of an alphabetical arrangement of *all* the species of each genus, and of *all* the genera of each family, is very great; and here, in the long run, the cards will have the advantage. When this time comes, however, it is hoped that the whole will be transferred to printed pages, like the 'Index Kewensis' and Sherborn's 'Index Animalium.' With regard to the International Catalogue, I need say nothing after Professor Ward's recent review (Science, January 27, p. 147); but I was very glad to learn, when in England last summer, that the Zoological Society will not abandon the *Record* while the International Catalogue is conducted on the present basis.

The great superiority of the *Record* is, of course, due to the fact that it is prepared by men who have the most intimate acquaintance with the subjects recorded. In no other way can the work be done satisfactorily, and zoologists ought to feel sincerely grateful that men like D. Sharp, G. A. Boulenger, F. A. Bather, E. A. Smith, R. B. Sharpe and others are willing to labor in their service; to labor, it may be added, for the most trifling pay. Under Dr. Sharp's editorship, the work has greatly improved, and has reached a really marvellous standard of excellence, tested by the groups of which one has particular knowledge. I do not mean to say that there are no errors; but they are remarkably few, and none are due to gross ignorance, like some of those in the International Catalogue. One amusing slip, a few years ago, is worth citing, but it is wholly exceptional. An entomological article was published 'By J. D. Tinsley, A. & M. College, Mesilla Park, N. M.' The Zurich card came in due course, with the article credited to 'J. D. Tinsley and M. College.' I said to myself, that is a blunder the *Zoological Record* would never make; but behold! when it arrived, it contained exactly the same blunder. I dare say M. College will be long remembered as an entomological writer.

Every new volume of the *Record* reminds one of the perennial subject of zoological nomenclature. It does seem that the publication of homonymous generic names is somewhat abating, but I notice in the present volume *Acanthophallus,* Luehe (not Cope, 1893), *Aldrichia,* Theobald (not Coquillett, 1894), *Aporema,* Dall (not Scudder, 1890), *Angelia,* Lower (not Berlese, 1885), *Kirbya,* Melichar (not Desvoidy, 1830), *Nicholsonia,* Tutt (not Kiaer, 1899), *Pleroma,* Melichar (not Sollas, 1888), *Rhynchomys,* Fairmaire (not Thomas, 1895), *Rileya,* Huene (not Howard, 1888), *Thaumasia,* Westerlund (not Perty, 1830), and some others. All these will of course have to be changed. There are also many names which are nearly the same as others, most of which will probably be changed by some one. I am strongly of the opinion, myself, that they should be let alone; as they are distinguishable, and the necessary changes of names are numerous enough. At the same time, it would save trouble if authors would not propose such names. Examples out of the present record are: *Abbottina,* Jordan & Fowler (not *Abbottana,* Hulst), *Asthenoceros,* Laidlaw (not *Asthenoceras,* Buckman), *Biroa,* Bolivar (not *Biroia,* Szep.), *Boccharis,* Distant (not *Bocchoris,* Moore), *Bolla,* Mabille (not *Bollia,* Jones), *Charidia,* Mabille (not *Charidea,* Baly), *Epimela,* Weise (not *Epimelus,*

Edw.), *Greya,* Busck (not *Graya,* Guenth.), *Guerinius,* Ashmead (not *Guerinia,* Bate), *Imeria,* Cameron (not *Imera,* Pascoe), *Ivela,* Swinhoe (not *Ivella,* Lubbock), *Nisia,* Melichar (not *Nisa,* Casey), *Occia,* Tosquinet (not *Occa,* Jord. & Everm.), *Reuterella,* Enderlein (not *Reuteriella,* Signoret).

A few generic and subgeneric names have been omitted; I notice the following: *Crewella* (*An. Mag. N. Hist.,* XII., 202), *Martinella* (*An. Mag. N. Hist.,* XII., 450), *Gueriniella* (Fernald, 'Cat. Coccidæ,' 331), *Kuwania* (*t. c.,* 32), *Kuwanina* (*t. c.,* 121).

It is worth while to say something about the importation of the *Record.* It used to come promptly by mail, but the 1902 volume was just overweight. It was mailed, nevertheless, by the Zoological Society, with the understanding that it would be delivered as before. The British postal authorities took it out of the mails, and turned it over to the American Express Company, with whom they have a contract for the carriage of parcels too heavy for the transatlantic mails. The volume arrived in New York, but was not forwarded until considerable delay had occurred and I had been obliged to pay extra express charges and a heavy import tax. This year, by using lighter paper, I believe, the book was kept just within the specified weight, and it came promptly by mail, with no trouble and no customs dues. It is an outrage to charge duty on a book of this sort, published at a loss, and one would like to know why the charge was made in one case when it was not found necessary in the other.

It is proper to add, that whereas the *Zoological Record* was formerly to be had only as a complete volume, the several subjects may now be purchased separately at moderate prices.

T. D. A. COCKERELL.

Les Lois Naturelles: Réflexions d'un Biologiste sur les Sciences. By F. LE DANTEC. Paris, F. Alcan. 1904. Pp. xvi + 308.

M. Le Dantec has two motives in view: to determine the meaning of the words 'natural law,' and, on the basis of this determination, to define or to revise the main scientific conceptions in use to-day. The meaning of 'natural law' is investigated from a standpoint due to the teachings of biology, with a resulting definition which resembles those of Pearson, Mach, Ostwald, Poincaré and others, and is in substantial accord with the general 'humanistic' philosophy. The author then discusses the meaning of such conceptions as straight line, plane, continuum, mass, force, entropy, absolute zero, inertia, conservation of energy, atom, ether, living matter, thought. With so broad a field to cover, the treatment of each conception must needs be brief; but it is at least direct, systematic and clear.

In the introduction (16 pp.) the general considerations are laid down which will determine the author's definition of natural law. Of the external world we know only the ways in which it affects us, the relations it bears to us. These ways or relations come to us through several gateways—namely, the senses —which the author calls the 'sensorial cantons' (sight, touch, temperature, smell, taste, etc.). Of these there are, we are told, many more than physiology admits, though we are not given a complete list of them. They are each irreducible, inexpressible in terms of any other sense. What we see has form and color, but is not loud nor hot; temperature has no color nor sweetness, tastes are not square nor round. What is revealed to one sense can not properly be described in terms of any other sense. Now science is first of all a record of these quite different classes of sense-impressions.

The subject is continued in Book I., 'The Sensorial Cantons and Monism.' Man is not only passive toward the external world. He reacts upon his environment; and in order to do so he makes hypotheses about the constitution of that environment. In the early stages of man's development these are quite as likely to be useless as not, but natural selection preserves the useful and weeds out the useless, till in the course of ages the former become instinctive. Thus our instinctive belief that arithmetic is infallibly correct, or that unsupported bodies fall, is the 'hereditary résumé of ancestral experience' (p. 3). We regard it as an *a priori* truth because the belief has been so long perpetuated by natural selection.