account, returning, however, in a couple of days gaunt, thin and lame. Having been well fed and recovering their spirits and strength, they would again betake themselves to the desert, to return again to their master's house, worn and thin. These hounds, if left to themselves, would have soon perished, while the collie would have been successful in the struggle for existence.

Anything but a pleasing picture is drawn of the struggle the new settler has with Nature in his new home. Animals, birds, insects, and even inanimate forces are all arrayed against him, but the author considers even the severity of the struggle conducive to the well-being of the individual concerned. "The man," he says, "who finishes his course by a fall from his horse, or is swept away and drowned when fording a swollen stream, has, in most cases, spent a happier life than he who dies of apoplexy in the counting-house or dining room; or who, finding that end which seemed so infinitely beautiful to Leigh Hunt (which to me seems so unutterably hateful), drops his white face upon the open book before him. Certainly he has been less world-weary, and has never been heard to whine and snivel about the vanity of all things."

An interesting account of leaf-cutting ants is given (pp. 138–142), and the bird-music of South America is stoutly defended and favorably compared to that of Europe. He says: "The bird language of the English wood or orchard, made up in most part of melodious tones, may be compared to a band composed entirely of small wind instruments with a limited range of sound and which produces no storms of noise, eccentric flights and violent contrasts, nor anything to startle a listener — a sweet but somewhat tame performance. The South American forest has more the character of an orchestra, in which a countless number of varied instruments take part in a performance in which there are many noisy discords, while the tender, spiritual tones heard at intervals seem, by contrast, infinitely sweet and precious."

Two of the chapters deal with "Sight in Savages" and "Eyes." These have many points of interest which cannot be referred to in detail here. The one on the "Plains of Patagonia" deals with that peculiar topic of why certain scenes, inherently not pleasing or attractive, withal impress themselves upon the mind with wonderful vividness and are always recalled with pleasure. The plains are not possessed of great scenic attractions, for "Everywhere through the light, gray mould, gray as ashes and formed by the ashes of myriads of dead trees, where the wind had blown on it, or the rain had washed it away, the underlying yellow sand appeared, and the old ocean-polished pebbles, dull red, and gray, and green, and yellow." From an elevation "On every side it stretched away in great undulations: but the undulations were wild and irregular; the hills were rounded and cone-shaped, they were solitary and in groups and ranges; some sloped gently, others were ridge-like and stretched away in league-long terraces, with other terraces beyond, and all alike were clothed in the gray everlasting thorny vegetation." There is, also, a striking lack of animal life. "All day the silence seemed grateful, it was very perfect, very profound. There were no insects, and the only bird-sound — a feeble chirp of alarm emitted by a small skulking wren-like species — was not heard oftener than two or three times an hour. The only sounds as I rode were the muffled hoof-strokes of my horse, scratching of twigs against my boat or saddle flap, and the low panting of the dog. And it seemed to be a relief to escape even from these sounds when I dismounted and sat down: for in a few moments the dog would stretch his head out on his paws and go to sleep, and then there would be no sound, not even the rustle of a leaf. For unless the wind blows strong there is no fluttering motion and no whisper in the small stiff undeciduous leaves, and the bushes stand unmoving as if carved out of stone." Day after day he was drawn to these dreary wastes and the peculiar state of mind seemingly induced by them is thus described: "During those solitary days it was a rare thing for any thought to cross my mind: animal forms did not cross my vision or bird-voices assail my hearing more rarely. In that novel state of mind I was in, thought had become impossible. Elsewhere I had always been able to think most freely on horseback; and on the pampas, even in the most lonely places, my mind was always most active when I travelled at a swinging gallop. This was doubtless habit; but now, with a horse under me, I had become incapable of reflection; my mind had suddenly transformed itself from a thinking machine into a machine for some other unknown purpose. To think was like setting in motion a noisy engine in my brain and there was something there which bade me be still, and I was forced to obey. My state was one of suspense and watchfulness; yet I had no expectation of meeting with an adventure and felt as free from apprehension as I feel now when sitting in a room in London. The change in me was just as great and wonderful as if I had changed my identity for that of another man or animal; but at the time I was powerless to wonder at or speculate about it; the state seemed familiar rather than strange, and although accompanied by a strong feeling of elation, I did not know it — did not know that something had come between me and my intellect — until I lost it and returned to my former self — to thinking, and the old insipid existence."

The peculiar state of mind here described the author attributes to a reversion to a primitive and savage mental condition, a state of intense watchfulness and alertness, but without the exercise of any of the higher mental faculties. He believes that man still retains much of the savage in him and this is brought out in wild and desert places, in times of great danger and under many adverse circumstances. This, like many other questions, touched upon or discussed, is food for thought for the reader.

JOSEPH F. JAMES

Washington, D. C.

The Coal-Tar Colors, with Especial Reference to Their Injurious Qualities and the Restriction of Their Use: A Sanitary and Medico-Legal Investigation. By THEODORE WEYL. Translated, with permission of the author, by Henry Leffmann, M.D., Ph.D. Philadelphia, P. Blakiston, Son, & Co.

THE coal-tar colors having replaced the vegetable products in all branches of dyeing, a study of their sanitary relations becomes of great interest, and the more particularly, too, because of their rapidly extending application in the coloration of foods and of articles of daily household use. The call for active legislation in these matters has become imperative, but the exact legal status of the new colors has not yet been clearly defined, nor has their physiological action been sufficiently demonstrated. The civilized governments have passed laws regulating the sale and use of certain coal-tar colors, but, in correspondence with the imperfect knowledge we have as yet attained in this branch of science, these legal statutes proved inadequate and failed in their purpose. To determine by direct experiment the physiological action of the colors in question, and thus to provide a basis for a new and better legislation, was the work undertaken by Dr. Weyl, and this little book upon the sanitary relations of the coal-tar colors, translated from the German by Dr. Leffmann, is the published account of these same experiments, together with much else of importance and interest. The book is somewhat technical, but this need deter no one from its perusal, for, as Dr. Leffmann remarks in his preface, "the essential matter is so distinctly set forth that the chemical portion may be passed by those who are unable to comprehend it." There is no portion that may not be read with profit by all, the technicalities are well masked behind good English, and, thanks to Dr. Leffmann, we have a book of live interest from beginning to end. Reviewing the book critically, we have but one fault to find, and that with the arrangement. It will suffice to name the parts in their order as follows: Translator's Preface, Preface, Contents, Introduction, General Part, to page 34, Appendix, pages 35–60, Special Part, pages 61–148, Appendix, Index. This seems to us an original system of book-making, but, after all, change the *names* of the parts, and we have everything in proper place.

Beginning the book with the General Part, we have a few pages on the preparation of the coal-tar colors, their classification, nomenclature, commercial forms, uses, etc. The so-called poisonous colors are then discussed, and the arsenical nature of many of the earlier manufactures is pointed out. Fuchsine, for exam-

ple, thanks to its contained arsenic, was long regarded as poisonous, until being produced in a state of purity, its entire harmlessness was demonstrated. There is a general review of the laws regulating the use of poisonous colors, and then, *verbatim*, the enactments of Germany under date of July 5, 1887. In 1888 there were appended to the said enactments regulations as to the examination of colors, fabrics, fruit jellies, liquids, etc., for arsenic and tin, and these Dr. Weyl has given in full. The methods are interesting and exact, though not original. The laws of other countries than Germany are given in some detail, and then we pass to the experimental part, the method to be followed being first described. As it was out of the question to test all, or even the greater portion, of the numberless coal-tar derivatives, Dr. Weyl selected such as were suspicious or had already been regarded as poisonous and endeavored to take those in most general use. Of the nitroso colors, we have dinitrosoresorcinol and naphthol green, B. The nitro colors include picric acid, saffron-substitute, Martins' yellow, naphthol yellow S, brilliant yellow, and aurantia, and of these only the sulphonated colors, naphthol yellow, and Martin's yellow were found to be harmless. The azo- colors are discussed at some length from both a technical and toxicological standpoint, but of the twenty-three colors examined only two, menatil yellow, and orange II., produced distinctly poisonous effects when administered by the stomach. Many, however, developed a slight albuminuria, and one at least was plainly poisonous when introduced into the subcutaneous cellular tissue.

It is highly gratifying to remark the comparative harmlessness of by far the greater number of the coal-tar colors, and even in those colors which are indicated as poisonous such large does are necessary in order to produce toxic effect as to render accidental poisoning from the same a practical impossibility.

Much honor is due Dr. Leffmann for his part in giving to the English-reading public this book, the first on the subject in our language,— but the hearty reception it has met with from chemist, medico-legal expert, and medical practitioner alike, bespeaks sufficiently its worth and opportune appearance.

CHARLES PLATT.

Alternating Currents. By FREDERICK BEDELL, Ph.D., and A. C. CREHORE, Ph.D., Instructors in Physics, Cornell University. New York, W. J. Johnson Co.

THE Johnson Co. is to be congratulated upon the appearance and make-up of this volume. The large, clear print, good paper, and well-drawn figures, make it one of the best books, from a mechanical standpoint, which has ever been published. On careful examination there does not appear to be a single misprint, or a single error in the mathematical formulæ, in marked contrast to the slipshod English and errata which disfigure almost every page of Fleming's book. No less are the authors to be congratulated on their work, for this book will probably be for years a standard text-book on the subject. Whatever one may find to criticise, it will not be the manner in which the subject is treated, nor mistakes in the treatment.

The subject is developed in a logical and simple manner. In Part I., which contains the analytical methods, we have, after an introduction on the elementary notions of the magnetic field, current flow, and harmonic motion, the general equation for circuits with resistance and self-induction; then the solution to this equation, and its application to the different cases possible. The constants of the equation are determined in each case, and curves plotted from actual values of the resistance and self-induction. Next in order come the general equations for circuits with capacity and resistance, and circuits with resistance, capacity, and self-induction. These are treated in the same manner. All possible cases are considered, the constants determined and curves drawn to illustrate the solutions.

Chapters xii. and xiii. treat of circuits with distributed capacity and self-induction, a subject of the utmost importance in these days of long-distance telephoning and telegraphy.

Part II. contains the graphical treatment. The analytical results obtained in Part I. are made use of as a foundation for the graphical methods. In addition to the cases considered in Part I. we have cases of circuits, in series and parallel, containing different voltages, resistances, self-inductions and capacities, and the results of variations of the latter in such circuits. At the end of the book is given a table of mechanical and electrical analogies, amplified from that previously given by other writers. The consistent notation used throughout the book gives an added pleasure to its perusal.

There are some things omitted which might have been treated of with advantage. For instance, though the graphical solution of problems concerning divided circuits is given, the analytical is not. If Lord Rayleigh's method were the only one known, there might be a reason for this, but those who are readers of *La Lumiere Electrique* and *L'Electrician*, will call to mind various neat and simple methods of treating the subject, and the latter is too important, practically, to be able to do without any thing which can add to our information.

We understand that the authors have underway a volume on alternating circuits containing iron. With Kennelly's and Steinmetz's laws, we may expect from the analytical treatment much that is new and important with regard to the best size and dimensions of transformers for given efficiency and output, etc.

This work has been adopted as a text-book by a number of American universities, Cornell, Purdue, University of California, and others.

R. A. F.

Comparative Philology of the Old and New Worlds with Reference to Archaic Speech. By R. P. GREG, F.S.A., F.G.S., etc. 1 Vol. LXXII. 355 p. Royal 8°. London, Kegan Paul, Trench, Trübner & Co., 1893.

IT it a painful duty for a reviewer to take up a work which is honest in intention and laborious in execution, but hopelessly deficient in method; and such is the one before us. To issue its considerably more than four hundred large pages must have cost the author a great deal of work and of money; yet for all scientific purposes the results he reaches must be estimated as scarcely above zero.

The judgment may seem harsh, but let us see what he sets out to prove and what methods he adopts. He writes to support the hypothesis of an original unity of language, of an original common tongue, an archaic speech of great simplicity, composed of differentiated emotional and imitative utterances, fragments of which can be traced in all the languages of the world, bringing them, therefore, into a genetic relationship. To prove this, he devotes over 350 pages to "Tables of Accordances," lists of words which he believes to be from the same root in the most diverse tongues. The hypothesis is by no means a novel one, nor does he claim it as such, but perhaps it has not before been urged with such abundance of illustration.

Whatever one thinks of the hypothesis, all will agree that a competent knowledge of linguistics should be asked in its supporters, if they claim a hearing before the scientific public; and just here Mr. Greg is strangely deficient. His introduction begins with a survey of American languages, and as these figure largely in the tables, they will serve as a test of his work in general.

His authorities at once awake astonishment. Ignatius Donnelly's "Atlantis," the second-hand reports of Bancroft, Canon Cook, Hyde Clark, and Bradford, the tracts of Professor Campbell, and Vincente Lopez, and a few unimportant and defective vocabularies, such as these of Marcoy and Parry, are the books that figure most prominently in his "list of authorities" What he has learned from them is on a par with their value. He speaks (p. x.) of "the ancient Nahua and Aztec languages of Mexico," unaware that these words are merely different names for the same language. On the same page he refers to the "Californian" language, as if any such existed; and attributes to Schoolcraft (instead of Lieber) the term *holophrastic*, as applied to American idioms. Who "Dr. Daniel Whitney, the well-known American philologist," may be, will certainly puzzle readers, as he is surely not known on this side of the Atlantic.

When it comes to the tables of accordances, all American languages are conveniently divided into northern, central, and