of large leading coupled wheels; many engines were running in India of this design before Mr. Stroudley adopted it, and the whole question can be narrowed down to the comparative life of tyres under different types of engines; there can be no doubt that a four-wheeled bogie or a Bissel truck in front saves the tyres of the leading coupled wheels, a larger mileage being obtained from them before they require to be returned.

Chapter V. includes a description of the sand blast arrangement for sanding the rails to prevent the slipping of the driving wheels. This apparatus, small as it is, has left its mark on the design of express locomotives. The single engine has again come to the front for express work with marked success, the latest design of Midland and Caledonian engines being examples.

This volume taken as a whole is most interesting, and should be of value to all connected with the railway system of this country as a book of reference.

N. J. LOCKYER.

OUR BOOK SHELF.

Sketches of British Insects. By Rev. W. Houghton, M.A., F.L.S., M.S.L. (London: O. Newmann and Co., 1892.)

IT is satisfactory to find that there is sufficient demand for elementary books on entomology to render necessary a new edition of Mr. Houghton's "Sketches of British Insects;" and for those who, as dwellers in the country, wish to gain some insight into the insect life around them few better books could be found. The differences between the several orders of insects and the main distinctions of the families are plainly and intelligibly set forth, though in a few instances the definition of terms and sections is somewhat faulty; thus, "Arthropod" would be more fitly translated "with jointed feet" instead of "with feet at the joints," and the numerous exceptions are not enough insisted on, there being for instance many insects with aquatic respiration and crustacea with aerial. In Lepidoptera the tongue is often completely absent, whilst in butterflies the forelegs are never wanting, as stated, though in certain families they are rudimentary in both sexes or in the male only, and again the two pairs of spurs on the hind tibiæ are present in the vast majority of moths and also in many skippers. The insects selected for description are well chosen, either as being conspicuous and typical of their families or as illustrating by their peculiarities some principle of adaptation to surroundings, though in many cases the classification is not according to modern ideas; thus, the clearwings (*Sesia*, &c.) have no affinities with the beehawks (*Hemaris*), which belong to the *Sphinges;* and the snouts (*Hypena*) are *Noctues* not *Pyrals*. The account in the Introduction of the structure and metamorphoses is especially simple and clear, and the small volume is on the whole an admirable sketch of British insect life, though the coloration of the plates might have been made much less crude without adding materially to the cost of production.

The Birds of Lancashire. By F. S. Mitchell. Second Edition. Revised and Annotated by Howard Saunders. (London: Gurney and Jackson, 1892.)

WE are glad to welcome a new edition of this book, which we reviewed shortly after the publication of the first edition NATURE, vol. xxxii. p. 241). The task of preparing a new edition (in the absence of Mr. Mitchell from England) was undertaken by Mr. Howard Saunders, and it is scarcely necessary to say that he has discharged his duty thoroughly. He has no personal connection with Lancashire, but he has had much help from local authorities, especially from Mr. R. J. Howard, of Blackburn; and with their aid he has brought the book, as far practicable, up to date. Several species have been added to the list, and there is a new index.

Borneo: Its Geology and Mineral Resources. By Theodor Posewitz. Translated from the German by Frederick H. Hatch. (London: Edward Stanford, 1892.)

THE original work, of which this is a translation, has been reviewed in NATURE (vol. xl. p. 49), so that it is unnecessary now to do more than record the fact that an English rendering of the book has been published. Dr. Hatch has done his work most conscientiously, and the translation is likely to be much appreciated by students of geology and mineralogy, and by all who have any reason for being specially interested in the material resources of Borneo.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

"A New Course of Chemical Instruction."

I AM much interested in the article in NATURE for September 29, entitled "A New Course of Chemical Instruction," especially as the writer, in the criticism of the book in question, whilst thinking that the method there advocated has theoretically more to recommend it than any other, doubts whether practically the time required is not an insurmountable obstacle.

For four years I have been able to teach beginners in Chemistry on a method very closely allied to the one here proposed, that is to say, one in which no experiment is performed without a definite object in view—the final object being the solution of a given problem and no idea being given to the pupil of what the result will be, and I am glad to be able to say that the time required is *not* such a serious drawback as might be supposed, whilst the intense interest aroused and the training in scientific methods of work amply compensate for the slower acquirement of chemical facts.

I have not the advantage of being acquainted with Mr. Castell-Evans' book, so that I am not quite sure how nearly my work would agree with his course, but the fundamental principle is undoubtedly the same, and is the one laid down by Dr. Armstrong in the report of the British Association Committee on Chemical Teaching, where he advocates the teaching of Chemical method rather than Chemical facts.

What generally appals the beginner in Chemistry is the multitude of facts to be remembered; it seems a mere question of memory, and in consequence so dull and uninteresting, that the explosion or "burst up" is the one point to be looked forward to in the lesson. By this new method the pupils themselves are put into the position of discoverers, they know why they are at work, what it is they want to discover, and as one experiment after another adds a new link to the chain of evidence which is solving their problem, their interest grows so rapidly, that I have seen at a demonstration lesson a whole class rise to their feet with excitement when the final touch was being put to the problem which it had taken them three or four lessons to solve. Facts learned with so much interest are not forgotten and form a solid basis which it is true is slowly laid, especially at first, but it is interesting to see how much more quickly and easily later facts are assimilated, each one fitting itself in with the knowledge already acquired, and even when it becomes a ques-