

amount of material to be dealt with makes compression a *sine qua non*. It is only a taste we get; but the voluminous references to original sources forming the extensive footnotes point the way to a fuller feast. It is as a reference book that the chief value of the volume will be found; it is not intended for consecutive reading.

Each paragraph is a highly condensed account of a particular part of the subject. Thus von Rohr concentrates into a few pages the principal facts treated at more adequate length in his treatise on photographic objectives.

Again, von Seidel's method for dealing with the aberrations of lenses is limited to what seems very scanty treatment when the importance of the method is taken into consideration. But for fuller information the author is obliged to refer to a forthcoming work by A. König and himself—there is only room for outlines in a work like the present.

The work throughout is produced with the thoroughness which is characteristic of German publications. We look forward to the completion of the entire book.

*Laboratory Exercises in Physical Chemistry.* By Frederick H. Getman. Pp. viii+241. (New York: Wiley and Sons; London: Chapman and Hall, Ltd., 1904.) Price 8s. 6d. net.

THE title of this book might lead one to expect that what is really a distinct want had at length been met. Beyond the title, however, there is little in it that merits favourable comment; both in conception and in execution it is most inadequate. One finds, for example, that viscosity and surface-tension are accorded fourteen pages, of which four are purely theoretical and wholly out of place, whilst solubility is disposed of in four and a half pages. Again, we discover molecular volume in the chapter on thermometry, and polarimetry in the chapter entitled "The Spectroscope"! Not only is the author hopelessly deficient in the general sense of proportion and arrangement, but in matters of detail he is equally at fault. He actually (p. 30) introduces the temperature correction of the barometer into the calculation of a vapour density by Victor Meyer's method—the only method given—and does not even succeed in doing it correctly. He defines the unit of resistance as the international ohm (p. 153), and then gives his data in terms of the Siemens mercury unit (p. 172), which is never defined or even mentioned. Turning to his practical instructions we encounter the same thoughtlessness and omission of important details. The student who carried out a series of conductivity measurements at different dilutions according to the instructions on p. 177, for example, would obtain truly wonderful results, for no mention is made of the necessity of having two pipettes so adjusted that one withdraws exactly the same volume as the other delivers. What, again, is a student to make of the instruction on p. 178—"About 20 c.c. of a  $N/32$  solution of pure sodium hydroxide is titrated with the dry acid of which the basicity is sought"? These instances suffice.

In closing the volume one can only express the hope that there may speedily be forthcoming a book which shall be in fact what this is in pretension.

*Les Animaux domestiques.* By J. Anglais. Pp. 103; illustrated. (Paris: Schleicher Frères et Cie., 1904.) THE object of this volume may be best described by paraphrasing the first portion of the introduction, where Dr. Anglais states that it has been his aim, with the aid of a number of ingeniously planned coloured plates, to describe the essential characteristics, both external and internal, of a certain limited number of

types of our most familiar domesticated animals. It is addressed to all who desire to make themselves acquainted with the leading features and characteristics of such animals, without the drudgery of long and profound practical study, and to acquire a general idea of their physiology and the history and object of their subjugation by man. As many details as possible of the peculiarities of the external form and of the internal anatomy are displayed in the illustrations and described in the text, so that it is hoped the work will serve in the case of some readers as an epitome of comparative anatomy and morphology, while for others it may form a starting point for more detailed study. The animals selected for illustration are the horse, the cow, the sheep, the pig, the dog, the cock, and the goose, each being illustrated and described on the same plan.

The illustrations of each species are five in number, and are printed on both sides of the cards, which are cut out to the shape of the animal, and so arranged as to fold over one another. The first shows the external form, the second the skeleton, the third the vascular system, the fourth the muscles, and the fifth the nervous system and viscera.

So far as anatomy can be learnt by means of diagrams, the work appears to deserve all that is claimed for it, and it will probably prove of considerable assistance to artists. Whether all the subjects selected for illustration would meet with commendation at the hands of breeders may, perhaps, be open to question.

R. L.

#### 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.*

#### Traction of Carriages.

IN tentative answer to your correspondent, p. 270, I suggest the following:—

The best angle of traction on a rough or irregular surface is at an upward inclination to its general slope. This upward slanting pull can be applied to a two-wheeled vehicle, and to the fore-wheels of any vehicle, but not to the hind wheels—especially if they are far away.

Consider, further, the summit of a hill, and let a waggon be so elongated that its hind wheels are still ascending while the horse is descending: his pull is exerted at a very bad angle on this part of the load, and in extreme cases the hill might almost act as a detent.

I should like to take the opportunity of saying that whether the traditional heavy draught of a long-bodied carriage is well founded or not, I am convinced that the ordinary hansom cab is badly balanced, and that a horse would be better with some load on his back, except when descending a hill. The comfort of a wheelbarrow over a balanced cart is considerable.

Though it may be easy to overdo the loading, nothing can be worse than a constant upward pressure on the chest of a horse: a pressure which at present automatically increases on an up grade, thus tending to deprive the animal of part of his own weight, on the existence of which the efficacy of every locomotive depends.

OLIVER LODGE.

#### Lobster Hatching.

PERHAPS your readers interested in economic marine biology may care to know, as a small contribution to the record of times and seasons, that the berried-lobsters kept at the Port Erin Biological Station started hatching out their young on July 15. So far the loss after hatching has been under 1 per cent. We find the best food for the young lobsters to be finely teased up fresh liver of the common shore crabs.

W. A. HERDMAN.

Biological Station, Port Erin, Isle of Man, July 22.