Pannett, demonstrates that practical classes in physiology are not confined to universities and colleges of university standard. The book itself is not a serious contribution to scientific literature, and its authors have neither the requisite training nor knowledge to make it such. It is a mere compilation or *rechauffé* from other well known text-books. One notes that one of the authors blazons upon the title-page that he has obtained a scholarship at the inter. M.B. examination at the University of London, and this is a fair index of what the reader may expect in the interior of the volume. A note-book carefully kept by any moderately good medical student would be equally worthy of publication.

W. D. H.

Laboratory Notes on Practical Metallurgy: being a Graduated Series of Exercises. Arranged by Walter Macfarlane, F.I.C. Pp. x+140. (London: Longmans, Green and Co., 1905.) Price 2*s.* 6*d.*

THIS little book is apparently intended as a first course for beginners in practical work in a metallurgical laboratory, and especially for those who are preparing for the examination of the Board of Education in stages 1 and 2 of practical metallurgy. For these classes of students it will be useful and deserves commendation.

It consists of a series of practical exercises, all well within the grasp of the average boy, graduated and arranged with the view of developing the habit of observation, and the instructions given for doing them show a much more intimate acquaintance with the simpler operations of a metallurgical laboratory than is generally found in works of this class. In the first eighteen pages the student is introduced to furnace work by simple experiments on the melting of metals under various conditions, to prepare him for the subsequent more difficult operations.

The preparation of the ordinary common alloys follows, and then a series of well-chosen exercises illustrates the oxidation of metals and the reduction of metallic oxides and sulphides. Later, the more complex subject of the principles on which the processes for the extraction of copper, lead, gold, and silver from their ores depend is dealt with.

The book concludes with a few elementary exercises in assaying gold and silver ores, and the analysis of coal and coke. In the appendix are several tables, the most important being one giving the percentage composition of some of the common alloys.

There are a few slips and blemishes in the text, but they are for the most part trivial, one of the chief being in the table just mentioned, in which the composition of the British gold coinage is given as gold 91·66, silver 8·33; the latter should of course be "copper." The book contains much useful information for junior students, and can be recommended for their use.

Le Liège. Ses produits et ses sous-produits. By M. Martignat. Pp. 158. (Paris: Gauthier-Villars and Masson et Cie.) Price 2.50 francs.

THE latest addition to the "Encyclopédie Scientifique des Aide-Mémoire" is divided into two parts. The first part is concerned with the formation of cork in *Quercus suber,* the distribution of the tree, its treatment, its maladies and enemies, &c., and concludes with an account of prices and other commercial considerations. The second part describes how the natural product is treated in the manufacture of corks of all kinds, and how it is utilised in the production of linoleum and other materials.

LETTERS TO THE EDITOR.

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Charge carried by the α Rays from Radium.

No special difficulty has been experienced in showing that the β particles (electrons), expelled from radium, carry with them a negative charge of electricity. The positive charge left behind on the vessel containing the radio-active material is simply and strikingly illustrated in the arrangement devised by Strutt, which is now popularly known as the "radium clock."

Since the α particles are deflected by a magnet as if they carried a positive charge, it is to be expected that this charge should be easily detected; but all the initial experiments made for this purpose resulted in failure. Since there are four products in radium which give out α particles, and only one which gives out β particles, it is theoretically to be expected that four α particles should be expelled from radium for each β particle.

In the Bakerian lecture (*Phil. Trans.*, series A, vol. cciv., p. 212, 1904) I described some experiments that were made to determine the charge carried by the α particles. About half a milligram of radium bromide was dissolved in water, and spread uniformly over a metal plate and evaporated to dryness. With a plate of 20 sq. cm. in area, the absorption of the α rays in the thin film of radium bromide is negligible. The solution of the radium released the emanation, and, several hours after removal, the activity of the radium fell to about one-quarter of its maximum value, and the β and γ rays from it practically disappeared. The experiments were made with the radium film at this minimum activity, in order to avoid the complication which would ensue if the β particles were present. An insulated plate was placed parallel to the radium plate and about 3mm. away from it. The apparatus was enclosed in an air-tight vessel, which was exhausted to a very low vacuum. The current between the plates was measured by an electrometer. The saturation current between the plates rapidly fell with decrease of pressure, but soon reached a limiting value—about 1/1000 of the initial—which could not be reduced further, however good a vacuum was obtained. No certain evidence that the α particles carried a positive charge could be obtained. It was thought possible that the inability to reduce the current below this value might be due to a strong secondary radiation, consisting of slow-moving electrons, which were liberated by the impact of the α particles on matter. Strutt (*Phil. Mag.*, August, 1904) has also observed a very similar effect, using a plate of radio-tellurium, which is well suited for this purpose, as it gives out only α rays.

J. J. Thomson (*Proc.* Camb. Phil. Soc., November 14, 1904; see NATURE, December 15) has recently shown in a striking manner that a large number of slow-moving electrons are liberated from a plate of radio-tellurium, although this substance is supposed to emit only α particles. These electrons could be readily bent back to the plate from which they came by the action of a magnetic field. No indication, however, that the α particles carried a charge was obtained.

I have recently attacked this problem again, using the methods and apparatus previously described, but, in addition, employing a strong magnetic field to remove the slow-moving electrons present with the α particles. The apparatus was placed between the pole-pieces of an electromagnet, so that the field was parallel to the plane of the plates. In such a case, most of the escaping electrons describe curved paths and return to the plate from which they set out. On application of the magnetic field, a very striking alteration was observed in the magnitude of the current. The positive and negative currents for a given voltage were greatly reduced. The upper plate, into which the α particles were fired, rapidly gained a positive charge. In a good vacuum, this was the case whether the lower plate was charged positively, or negatively, or connected to earth. The magnitude of the charge, deduced from these experi-