

in which in eloquent words Abbe traces the debt of opticians to that great man.

At some future day a pupil of Abbe's will carry on the story and show how the next great advance in practical optics was the work of Abbe himself. His friends have done well to collect with loving care these writings of their master, and we who know him chiefly through his works are grateful to them for the manner in which they have discharged their task.

#### OUR BOOK SHELF.

*Magnetische Kraftfelder.* By H. Ebert. Second edition. Pp. xii+415. (Leipzig: J. A. Barth, 1905.) Price 7 marks.

THIS is a second edition of Prof. Ebert's well known treatise on magnetic fields of force, which first appeared in 1902. The author handles his subject as before with a wealth of illustration, and with a theoretical grasp, which make the book valuable alike to student and teacher. Indeed, the teacher will find in its pages many useful suggestions. Of these is the magnetic vane of Jaumann, depicted on p. 23, which recalls the appliance of Petruscheffsky, in which a small bar magnet was suspended through one pole, with a counterpoise to make it lie horizontally, and act as a one-pole magnet. Again, the little frame depicted on p. 29 for holding bar magnets during the operation of manufacturing their filing figures on a sheet of glass above them is worthy of notice. The author adopts as a brief synonym for "a point in a magnetic field to which we direct our attention" Boltzmann's term "Aufpunkt," for which we have no English equivalent. On p. 206 he uses the term "Billiontel" for  $10^{-9}$ , which is surely a slip, since in German, as in English, a billion is  $10^{12}$ , not  $10^9$ . On p. 54 his definition of unit pole is that it is such as to repel with a force of 1 dyne a similar pole when at a distance of 1 centimetre apart *in vacuo*, whereas hitherto the accepted definition has been when *in air*. The difference may be unimportant, but it should not pass without challenge. In this edition the author has cut out most of the section upon cyclical systems, and certain deductions of the Maxwell-Hertz equations which were formerly included. On the other hand, he has introduced new matter relating to the electronic view of electricity in its relation to magnetism and to the Zeeman phenomenon. While this part of the book has been shortened, there have been added at the end fresh sections on induction, on the magnetic circuit—a distinctly valuable chapter—and another of lesser merit on dynamo-machines. The author erroneously attributes to Pixii, on p. 359, the invention of the split-tube commutator. What Pixii used in 1832, on the suggestion of Ampère, was the divided mercury-cup familiar to electricians in the primitive motors of Ritchie.

It is distinctly interesting to find a summary of recent work on kathode rays, Becquerel rays, and the rays emitted by radium, appearing as an integral part of a chapter which opens with the action of the magnetic field upon a movable conductor carrying a current. The doctrine of the electron appears to be thoroughly accepted as an essential part of electromagnetism. But the definitions which the author gives on pp. 157 and 158 of an electron apparently exclude anything and everything that is not actually moving with a high velocity:—"Unter Elektron hat man die sich mit grosser Geschwindigkeit bewegend negative Elementarladung zu verstehen." Is an electron not an electron when it is at rest?

S. P. T.

*Inheritance in Poultry.* By C. B. Davenport. Pp. v+134. (Washington, D.C.: The Carnegie Institution, 1906.)

THIS is a valuable addition to the rapidly-increasing literature dealing with the subject of inheritance. It affords a good example of the growing complexity of the theories which have been founded on the famous discovery of Mendel. The simplicity of the original Mendelian system has now to be supplemented by such conceptions as those of "imperfect dominance," "incomplete segregation," "compound allelomorphs," and the like. The author of the present treatise, well known as the director of the station for experimental evolution at Cold Spring Harbour, New York, deserves much credit for the care with which his experiments have been devised and their results recorded. Each experiment is methodically described under the heads of "Statement of Problem," "Material," "Results," "Conclusions," and the general bearing of the whole series on evolutionary theory receives full and candid discussion in a final section. The author's standpoint, as was to be expected, is in the main Mendelian, but he recognises the facts that both dominance and recessiveness are frequently incomplete, and that "an adequate theory of gametic purity has not only to explain the simple Mendelian formula, but also the facts of imperfect dominance, impurity of extracted forms, latency and atavism, and occasional particulate inheritance." Prepotency (in Bateson's sense) he holds to be as truly important in inheritance as dominance. It is worth noting that de Vries's dictum as to the sharp separation of the constituent units which make up the characteristics of organisms, between which units transitions exist "as little as between the molecules of chemistry," is, in the author's opinion, not borne out by the present experiments; nor does he find confirmation of the same biologist's assertion as to the different modes of inheritance of "specific" and "varietal" characteristics.

There are a few marks of carelessness in the text, as where the birds represented by Figs. 1 and 2 are spoken of as "black-crested white Polish." The plates are generally admirable, but in the absence of colour it is difficult to distinguish between true white and reflected high lights—a point which in some cases is of great importance.

F. A. D.

*German Scientific and Technological Reader.* Book i., pp. ix+105; Book ii., pp. viii+115. By E. Classen and J. Lustgarten. (London and New York: Harper and Brothers, 1906.) Price 2s. net each.

THESE two books should serve a useful purpose in familiarising students of science who are anxious to read scientific works in the German language with expressions and terms common in such works, but not to be found in school-books. Both volumes consist of descriptive accounts of principles and properties relating to various departments of science, and of technological processes, plainly printed in Roman characters, and suitable for reading by students who know the rudiments of German grammar.

The descriptions in the first volume deal with the propædæutics of physical and chemical science, dyeing, metallurgy, electrotechnics, and engineering; and those in the second volume are concerned, in addition, with some special points in physics, chemistry and chemical technology, spinning and weaving, and brewing. There is a vocabulary in the first volume, but not in the second, which is somewhat more advanced, and requires the use of a dictionary.