

discharge from the liquid interior are fewer. Eruptions come from local reservoirs in the generally solid crust, which, however, may have a communication from beneath with the inner mass. In the fourth stage, when the crust layer approaches 50 kilometres, there is a further decline in number, though an increase in violence, of discharges from the liquid interior, but the activity of the reservoirs is maintained, and henceforth these are the main sources of vulcanicity. That is the age of catastrophic eruption, and the photosphere is disappearing. The next stage continues the cutting off of direct communication with the interior, separation takes place in the masses of magma, and local eruptions are still very violent. This phase may correspond with that stereotyped in the moon. The sixth stage begins, the seventh continues, the deposit of sediments, during which metamorphism is active in the lower beds, thus forming an outer skin to the crust layer. Eruptions continue to affect a plateau type in the earlier of these; the volume of the reservoirs is gradually being reduced, as well as the communications with the more distant interior of the earth. The eighth, in which the liquid reservoirs are few and small, and communication from within any part of the thickened crust layer to the interior very rarely exists, is the present period.

*Photographic Cameras and Accessories.* Edited by Paul N. Hasluck. Pp. 160. (London: Cassell and Co., Ltd., 1901.)

It is not often that one meets with amateur photographers who possess cameras made with their own hands, because at the present day instruments can be obtained at such prices that the pocket of even the most modest purchaser can be suited. This is, however, no reason why a camera should not be home-made; and, in fact, besides affording the worker a very pleasant occupation, especially anyone who is interested in carpentry, it redounds to his credit if he turns out a good-looking and serviceable camera and produces first-class pictures with it.

The contents of this little book will afford a very ready and serviceable guide to anyone who wishes to try his hand in this direction, and supply the reader with concise information on the details of the subject of which it treats. As we are told in the preface, the matter consists essentially of a digest of material contributed by a professional photographer to a weekly journal, so that the instructions should be, and are, thoroughly practical. The text is accompanied by a great many working drawings, 241 in number, and deals, not only with the construction of the bodies of cameras, but with dark slides, shutters and stands.

*Trattato elementare di Fisica.* Da Oreste Murani. Vol. iii. Optics and Electricity. Second edition. Pp. xxi+675. (Milan: Ulrico Hoepli, 1901.)

THIS is a descriptive treatise in which the experimental phenomena in optics and electricity are described and the apparatus used for exhibiting or applying them are illustrated by no less than 593 woodcuts. It is essentially non-mathematical in its treatment, the few formulæ included in the text in connection with such laws as the law of refraction of light and Ohm's law involving no calculus and merely the notation of trigonometry. In regard to modern electrical discoveries and notions, Prof. Murani has brought his treatise very much up-to-date, and the experiments of Righi, Lenard, Hittorf and Hertz on electric discharges, the Röntgen and Becquerel rays, Kerr's, Hall's and Zeeman's phenomena, Tesla's experiments, wireless telegraphy, the coherer and the Wehnelt interrupter, afford instances of the many recent innovations which are described at some length. In the concluding sections the author expresses doubts as to the efficacy of lightning conductors of the old style

when the effects of electromagnetic induction are taken into account. The book should be useful both as a class-book in technical colleges, for which purpose it is especially written, and as a work of reference for general readers who wish to acquire some notion of modern electricity and optics without entering into abstruse theories or technical minutiae. G. H. B.

*A First Course of Practical Science.* By J. H. Leonard, B.Sc. Pp. xii + 138. (London: John Murray, 1901.)

EXCELLENT courses of practical work in the rudiments of mensuration and physics are now available in several text-books, but there is still room for volumes like the present one. The exercises described are suitable for quite young beginners, and they will serve the double purpose of applying the pupils' knowledge of arithmetic and developing a scientific frame of mind. Simple measurements of length, area and volume, and calculations (particularly with decimals) referring to them, form the subjects of the opening chapters. Following these are laboratory exercises on weight and centre of gravity, relative weight, atmospheric pressure, thermal expansion, thermometers, latent heat, filtration, solution and distillation.

The experiments are described concisely and are well arranged, so that a pupil of average capacity could perform them without much assistance, and at the same time would acquire clear ideas on fundamental principles. We do not like such expressions as "Have all liquids got a latent heat? Have all gases got a latent heat?" but that is a detail. As a whole the book is satisfactory, and, with others of the same kind, will assist the movement in favour of introducing scientific measurements in early stages of instruction in schools. Dr. Gladstone contributes a short preface.

*Coltivazione delle Miniere.* By S. Bertolio. Pp. vii + 284, with 96 figures. (Milan: Hoepli, 1902 [*sic*]). Price L. 2'50.)

THIS is one of the numerous manuals published by Hoepli of Milan; it contains a useful little epitome of the art of mining. It is not fair to expect too much from a book costing only 2s., and consequently one must not carp too loudly at the absence of detailed descriptions and figures of certain important mining appliances. Steam shovels and dredges, which play so weighty a part nowadays, are merely mentioned by name, and hydraulic mining is dismissed in a couple of lines. This defect should be remedied in a second edition, for it is well even in a small manual to impress upon the student the great importance of all mechanical methods of excavation.

On the other hand, the author deserves credit for his picture of the well-marked projecting outcrops of three parallel lodes at Montevecchio in Sardinia; the student has not always the opportunity of seeing such a fine example in the field. Mistakes in foreign words are too frequent, and when the simple name of the inventor of the safety-lamp is spelt "Dawy," the Englishman feels aggrieved; however, all nations are treated alike, for the author is not absolutely faultless in his own tongue.

*The Ballads and Shorter Poems of Frederick V. Schiller.* Translated into English Verse by Gilbert Clark, M.A. Pp. xv + 408. (London: Williams and Norgate.)

SCHILLER's philosophical writings have admirers in the world of science, and this translation will contribute to the wider appreciation of his poems among people unable to read them in the original. The series of poetical parables and riddles referring to natural phenomena, and the verses on astronomy, astronomers, nature knowledge and transcendental philosophy are of interest to scientific minds.