the ground in a rude circle, while at the centre are large blocks which probably formed the central dolmen. "There are two entrances to the enclosure, a northern and a southern, and on the east side of the latter is a large detached mound. Four hundred yards west of the main enclosure is a still larger mound, known as Gib Hill, connected with it by a low rampart of earth, now nearly worn away." Buxton and Matlock lead Mr. Firth to make some quotations from Erasmus Darwin's poetical references to them in his "Botanic Garden: Economy of Vegetation," and "Loves of the Plants." Dr. Darwin knew and loved the scenes he described, whatever opinion may be held as to his possession of the divine afflatus. There are a few other references to people and scenes of especial interest to the scientific world, but the book will not be valued for these so much as for its bright narrative of literary and historical centres of Derbyshire, and its fine illustrations.

The Tower of Pelée. New Studies of the Great Volcano of Martinique. By Prof. Angelo Heilprin. Pp. 62+xxii plates. (Philadelphia and London: Lippincott, 1904.)

PROF. HEILPRIN'S latest volume on Martinique is chiefly remarkable for the beautiful photographic plates with which it is illustrated; they give an excellent idea of the features of the great tower of solid lava which for nearly three years has been the centre of interest in the crater of Pelée. One of these plates, however (No. xi), seems to have been accidentally printed upside down. In the accompanying text there is an account of the author's fourth visit to the volcano in June, 1903, and a good deal of somewhat discursive matter regarding the lessons to be learnt from the recent eruptions. The number of points which are still unsettled concerning the mechanism of the explosions and the concomitant phenomena is very large, and the author shows a wise caution in dealing with some of them. He advances the opinion that the tower of Pelée is a volcanic core of ancient consolidation, and not an extrusion of solidified new lava, as the French observers believe. We cannot believe this is at all likely to obtain general acceptance. J. S. F.

Experimental Researches on the Flow of Steam Through Nozzles and Orifices. By A. Rateau. Translated by H. Boyd Brydon. Pp. iv+76. (London: Constable and Co., Ltd., 1905.) Price 4*s*. 6*d*. net.

THE laws of flow of steam are of much importance in the design of turbines. A clear sketch is given of the theory, and then an account of an excellent experimental research to determine the values of the constants. Amongst previous experiments, those of Napier are English, not American as the author states. The novelty in M. Rateau's method is the use of an ejector condenser for condensing the steam. The rise of temperature, which is easily measured, gives the quantity of steam condensed. The errors of the method, especially that due to entrained water, are carefully examined. Convergent nozzles and a thin plate orifice were used. The results are compared with those by Hirn on air, and close agreement is found. In a note, the complex phenomenon of the discharge of hot water just on the point of evaporating is examined.

The translation is clear. It is, however, a defect, for English readers, that the principal formulæ are left as given by the author in foreign units. The book is essentially one for practical use, and it would have added much to the convenience of engineers if other formulæ than the one on p. 6 had been given in English units.

Introductory Mathematics. By R. B. Morgan. Pp. vi+151. (London: Blackie and Son, Ltd., 1905.) Price 2*s*.

IN Mr. Morgan's "Introductory Mathematics" the view of the author is that as soon as a boy knows decimal and vulgar fractions he should begin a mixed course of elementary practical mathematics comprising algebra, geometry, and squared-paper work, developed as a whole in mutual dependence, leading up through the manipulation of formulæ to the solution of problems involving simultaneous simple equations and giving a knowledge of the fundamental facts of geometry with a training in practical applications such as the plotting of graphs and of figures to scale, and the finding of simple areas and volumes. This scheme, ignoring the old water-tight compartment system, is a good one. The chapters on algebra and geometry usually alternate, and the work progresses on natural and easy lines, with illustrations of every-day interest. The author might with advantage have carried the idea still further and have brought in computations from quantitative experimental work in the laboratory, involving the use of the balance and measuring flask, and perhaps an investigation of the action of forces at a point. There are some minor defects, such as an occasional lack of precision in a statement, bad perspective in several of the figures, the use of a graph to give a forecast of population fifty years hence, &c. But the treatment of the subject as a whole is very satisfactory; there is a good collection of exercises, and the book is well suited to its purpose.

LETTERS TO THE EDITOR.

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The Dynamical Theory of Gases and of Radiation.

LORD RAYLEIGH, in a letter which appears in NATURE of May 18, opens up the general question of the applicability of the theorem of equipartition to the energy of the ether. As the discussion has arisen out of my "Theory of Gases," may I, by way of personal explanation, say that although I was fully alive to the questions referred to in this letter when writing my book, yet it seemed to me better not to drag the whole subject of radiation into a book on gases, but to reserve it for subsequent discussion? Since then I have written two papers in which questions similar to those raised by Lord Rayleigh are discussed from different aspects, but as neither of these papers is yet in print, I ask for space for a short reply explaining how my contentions bear on the special points raised by Lord Rayleigh's letter.

May I, in the first place, suggest that the slowness with which energy is transferred to the quicker modes of ether-vibration is a matter of calculation, and not of speculation? If the average time of collision of two molecules in a gas is a great multiple N of the period of a vibration, whether of matter or of ether, then the average transfer of energy to the vibration per collision can be shown to contain a factor of the order of smallness of e^{-N}. The calculations will be found in §§ 236–244 of my book. It is on these that I base my position, not on a mere speculation that the rate of transfer *may* be slow. Lord Rayleigh's example of a stretched string, say a piano wire, will illustrate the physical principle involved. If a piano hammer is heavily felted, the impact is of long duration compared with the shortest periods of vibration, so that the quickest vibrations are left with very little energy after the impact, and the higher harmonics are not heard. If the felting is worn away, the impact is of shorter duration, the higher harmonics are sounded, and the tone of the wire is "metallic."

The factor e^{-N} is so small for most of the ether-vibrations as to be negligible. There is no sharp line of demarcation between those vibrations which acquire energy