

and ventilate them by open covers at street level. Subsequent to this, and up to the year 1886 the typhoid death-rate showed a most remarkable decrease, falling during this period at its lowest to 16.3 per 100,000. Yielding, however, to the pressure of numerous public complaints about the obnoxious smells rising from the sewers in the various thoroughfares of the town, the Sanitary Committee decided in 1886 to close the open street ventilators, and to erect in their place cast-iron pipes up the sides of houses wherever the necessary permission of the house-owners could be obtained.

Since 1886, also, improvements have been made in the sewerage system of the town, for the old and small main sewers have been replaced by larger and better constructed ones at a cost of nearly 200,000*l.*; but in spite of this and other sanitary improvements, the typhoid death-rate has actually risen in Leicester during this latter period. *Felix qui potuit rerum cognoscere causas!*

It must indeed be frankly admitted that our knowledge of the conditions—and there may be many factors, which determine outbreaks of epidemic disease—is at present in some respects hopelessly inadequate. No more conclusive example of this is to be found than is presented by the diphtheria epidemic which has taken such a firm hold of London, and which has also manifested itself in various other parts of the country, and, despite all the boasted hygienic enlightenment of the closing years of the century, pursues its triumphant course practically unchecked.

Sewer gas may be charged with a great deal, but we also know that other factors—as, for example, infected water and milk—are also heavily weighted with responsibility in the dissemination of disease, and that to shift the whole burden of a particular epidemic upon any one single factor becomes the more unreasonable the wider our scientific horizon is extended.

G. C. FRANKLAND.

#### OUR BOOK SHELF.

*Chambers's Algebra for Schools.* By William Thomson M.A., B.Sc., F.R.S.E. (London: W. and R. Chambers 1898.)

THIS is a plainly written and well-arranged book of secondary grade, quite worthy of the crucial test which only practical teachers can apply. Among its praiseworthy features may be mentioned the attention paid to degree, homogeneity, and symmetry; the early introduction of the method of detached coefficients; and the elementary discussion of graphs. The chapter on indices is more satisfactory than is usually the case in works of this kind; on the other hand the chapter on surds is disappointingly conventional, and that on logarithms might certainly be revised with advantage. All logarithmic calculations ought to be printed in the form in which a computer would write them down on paper; explanations, of course, may be added when necessary.

The chapter on the binomial theorem for any exponent is not satisfactory: it would be much better simply to state the conditions under which the theorem is true, and to give some numerical examples to illustrate the use of it for purposes of approximate calculation.

The examples are numerous, and there is, on the whole, a refreshing absence of those fantastic absurdities which are never found except in text-books and examination papers. In the examples on variation, illustrations derived from physics might very well have been inserted:

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the same thing may be said about the examples on equations.

It is probably useless to protest against the method of solving quadratics by completing the square; like the Imperial system of weights and measures, it has become a national fetish, and its cult is proof against all the arguments of common sense.

G. B. M.

*Die Kraft und Materie im Raume. Grundlage einer neuen Schöpfungstheorie.* By A. Turner. Fifth edition. Pp. xxiv + 407, and 20 plates. (Leipzig: Theod. Thomas, 1897.)

IN his preface to the present edition of this work the author remarks:—

“We have given positive proofs of the untenability and the imaginary foundation upon which rest the hypotheses which have for their subject-matter the theory of vibration of a cosmic ether, whether these relate to light, heat, or to the artificial terms under the ægis of ‘the conversion of work into heat, energy into electricity, &c.’ in short the greater part of the hypotheses which form the foundation and chief support of the privileged sciences of to-day.

“They represent no scientific truths, but, together with the catch-words indicated, serve merely as a cloak for ignorance, their supporters having no suspicion of the nature or true inwardness of the phenomena in question or of their causal connection.”

Turning to the body of the work we find, expressed in somewhat similar style, a theory of the universe postulating matter and space as ultimate realities. Matter consists of centres of force attracting or repelling each other when they approach each other within certain limits. Light is the impression made on the optic nerve by radiant matter. The phenomena of heat are due to the repulsion of one substance by another, and so on. At the end of the book 150 theses are printed for the convenience of those who feel impelled to combat the author's views.

*The Observer's Atlas of the Heavens.* By William Peck, F.R.A.S., F.R.S.E. Charts 30; pp. 32. (London and Edinburgh: Gall and Inglis.)

THIS volume contains catalogues giving information relating to double stars, variable stars, nebulae, and other celestial bodies, together with thirty star charts in which the positions of nine thousand objects are shown.

The charts include the whole celestial sphere, and are drawn to a large scale, five degrees of a great circle being equal to one inch. They are arranged so that, as far as possible, each constellation is shown complete in itself. The scale of magnitudes is well chosen, the stars appearing with the same relative importance on the charts as in the heavens. The practical value of the atlas would be greatly enhanced, however, if a scale of magnitudes were attached to each chart.

The brighter stars, down to the third magnitude, are shown to a half, and fainter stars to a whole magnitude. To facilitate identification in the various catalogues, either a letter or Flamsteed number is attached to every important star. A commendable feature is the insertion of the various data, from which the charts were compiled, in the form of catalogues of the different celestial bodies. These catalogues will be found very useful, and include such information as the magnitudes of the brighter stars to the nearest tenth, and the positions of stars down to the fourth magnitude, with their Flamsteed and British Association numbers.

Other useful information is included, such as diagrams showing the appearances of over one thousand double stars when near the meridian, and a chart of the moon with an index.

Undoubtedly, this atlas will be found very useful by astronomical observers, especially amateurs, for whose requirements it seems to be particularly designed.