weight." Every element has a molecular symbol and a molecular weight assigned to it. Carbon, for instance, is represented by the molecular symbol C_2 and by the molecular weight 28. Now, on pp. 58 and 59 the reader is given to understand that the molecular weight of a substance is the specific gravity of the gas or vapour multiplied by 2 (the sp. gr. of hydrogen being taken as unity). On p. 130 it is further stated that carbon in all its forms is non-volatile. How then is the unfortunate student, or, in fact, any one else, to reconcile these statements with that found in the table that the molecular weight of carbon is 28, and what applies to this element applies of course to most of the others. We may also mention that in another part of the book (p. 160) a molecule of carbon is represented as consisting of twelve atoms. This may of course be a printer's error, but we find the same want of system in symbolic representation throughout the book.

We entirely agree with the authors that Inorganic Chemistry should receive more attention at the hands of chemists, but how is it that the authors do so little justice to what has been done in this branch of chemistry? Garzarolli-Thurnlackh's proof of the non-existence of chlorous anhydride is simply ignored, and the statements found in most text books with reference to this imaginary compound are again reproduced. The action of nitric acid on the metals is also represented by the usual text-book equations.

A good feature in the book is the arrangement of the properties, &c., of the substances described under different headings, which are convenient for ready reference.

There are many more points to which we might refer if space allowed, but we think we have said enough to indicate that in our opinion, at least, this new manual is not calculated to supply the "want felt, but not yet satisfied."

OUR BOOK SHELF

Technical Gas Analysis. By Clemens Winkler, Ph.D. Professor in Freiberg. Translated by George Lunge, Ph.D. (London: Van Voorst, 1885.)

PROF. LUNGE has rendered another service to the world of chemists, both students and practical men, in translating Winkler's small book on "Gas Analysis." We have here a really practical work which a man may use in a works or a teacher or student in a laboratory.

Winkler's book is scarcely known in this country, and we may venture to say that several, if not most, of the gas apparatus figured and described in this book are also scarcely known.

The book is decidedly practical, and treats in the first instance of methods of collecting gases; on measurement of gases; and on apparatus and methods of analysis. The translator has added a chapter on the nitrometer, and shows how it may be used for more extended analyses than the examination of nitrous vitriol. An appendix of useful tables makes the book a very valuable laboratory companion.

Lessons in Elementary Chemistry, Inorganic and Organic. By Sir Henry E. Roscoe, LL.D., F.R.S., Professor of Chemistry in the Victoria University, Owens College, Manchester. New Edition. (London: Macmillan and Co., 1886.)

THIS favourite text-book is so well known to students of chemistry that, whilst calling attention to the appearance of a new edition, we need only remark that the author has introduced several changes and additions which bring the book as well up to date as the limits of a work of this size will permit.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

New System of Earthquake Observations in Japan

OWING to the invention of new seismographs by the members of the Seismological Society of Japan, there has been of late a complete change in the system of earthquake observations in this country. The Meteorological Bureau now employs the horizontal pendulum and vertical-motion seismographs of Profs. J. Milne and T. Gray, and of Prof. J. A. Ewing for systematic observation, while the Imperial University of Tokio publishes from time to time detailed accounts of particular and more interesting shocks by the use of similar instruments. These seismographs register on a revolving glass plate or drum automatically started by the earthquake motion, components of horizontal and vertical motions of the earth on a magnified scale, thus producing continuous diagrams, and indicating successive displacement of the ground in conjunction with the time.

The account of the earthquake of December 28, 1885, the largest shock during the last three months, is here given as a sample of seismic record now issued in this country. The meanings of the terms employed are as follows: a, semi-amplitude of seismic wave; T, period of complete wave; V, maximum velocity in mm. per sec., or $\frac{2\pi a}{T}$; α, maximum acceleration in mm. per sec. per sec. or $\frac{V^2}{a}$.

At the Imperial University of Tokio, Japan, at 10h. 6m. 30s. on December 28, 1885

Maximum semi-amplitude of horizontal motion a_1 ...	1·8
Complete period T_1 corresponding to the max. horizontal motion	1·5
Maximum semi-amplitude of vertical motion a_2 ...	0·3
Complete period T_2 corresponding to the max. vertical motion	0·6
Direction of the max. horizontal motion	E.–W.
Duration	3m. 30s.

Remarks.—The motion slowly commenced, not accompanied by quick tremors, as is usually the case. At the 14th second from the commencement a considerable E.–W. motion occurred; in another second the maximum movement appeared in the same direction, which was followed by smaller shocks during about one minute; and from thence the oscillations gradually subsided. As usual, the particles of the ground did not move to and fro, but traced a curvilinear path, although the E.–W. components always remained greater than the S.–N. components. In all, over 130 shocks or complete waves were registered.

From figures given in the above table, the maximum velocity V and the maximum acceleration α may be calculated, which are, in this case for the horizontal motion, 7·6 mm. per sec. and 39 mm. per sec. per sec. respectively. The latter quantity is the measure of the *intensity* of the earthquake, and may be employed in determining the overthrowing power of body and shattering and other destructive effects produced on buildings. Although the records given by the oscillations of fluids, fissures on walls, rattling of wine-glasses, &c., might tell something about the nature of earthquakes, and are indeed invaluable in absence of suitable instruments, yet for the *absolute* measurements of seismic force the method above cited, I believe, is by far the best that has ever been attempted on this subject.

I may add in respect to the above earthquake, and in general, that the vertical motions are always—in our experience—smaller than horizontal ones, and the maxima and minima of these two kinds of motions are not synchronous. I shall have