

or absolute things. All things, *i.e.* all processes and states, are conditioned by other processes or states. (2) There is no process or state which is dependent on a single factor. All processes or states are conditioned by numerous factors. (3) Every process or state is inevitably determined by the sum of its conditions. Only under similar conditions do similar processes or states occur, and, conversely, different processes and states presuppose different conditions. (4) Every process or state is identical with the sum of its conditions. The totality of the conditions is the process or state. (5) All the conditions of a process or state are of equal value for its occurrence in so far as they are necessary. But it does not seem difficult to accept all these propositions and yet remain a good vitalist.

Dizionario di Merceologia e di Chimica Applicata.

By Prof. V. Villavecchia. Terza edizione. Vol. ii. Lettere N-Z e Indice. Pp. 1360. (Milan: Ulrico Hoepli, 1913.) Price 15 lire.

THE scope of this work and its especial features were explained when the first volume was reviewed. The second volume embraces articles from N to Z, and occupies 1170 half pages. All the articles are written very concisely; in fact, so concisely that, *e.g.*, the author has not yielded to the temptation to do more than mention the Italian occurrences of petroleum in the article "Petrolio greggio."

The remainder of the work, covering 200 pages, forms a very complete index. It is carried through in four languages, and includes also botanical and zoological names. Thus this index very greatly assists the reader who is not sufficiently conversant with the Italian language to depend on the alphabetical arrangement of the subject-matter in the body of the two volumes.

The Vertebrate Skeleton. By Prof. Sidney H. Reynolds. Pp. xvi+535. Second edition. (Cambridge: University Press, 1913.) Price 15s. net

THIS work, belonging to the Cambridge Zoological series, was reviewed at length in the issue of NATURE for July 15, 1897 (vol. lvi., p. 245), at the time of its original publication. The present edition has been revised and brought up to date. Prof. S. W. Williston has assisted Prof. Reynolds in this work, having rewritten the chapter on the Sauropsida and that on the general account of the skeleton in reptiles, as well as contributing some notes on birds and on the Stegocephalia.

Heaton's Annual: the Commercial Handbook of Canada and Boards of Trade Register, 1913. Edited by E. Heaton and J. B. Robinson. Pp. 401. (Toronto: Heaton's Agency; London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.) Price 5s.

THE ninth issue of this yearly handbook dealing with the resources of Canada is full of interest. It will prove directly useful to teachers of commercial geography, and much of the general information it provides will appeal to scientific readers.

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LETTERS TO THE EDITOR.

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On the Appearance of Helium and Neon in Vacuum Tubes.

SINCE reading before the Chemical Society (see NATURE, February 13, p. 653) the paper on the presence of helium and neon in vacuum tubes (containing hydrogen) after the gas had been sparked, we have carefully compared the spectrum lines that are supposed to be characteristic of these gases. The result has been interesting. In the case of neon and hydrogen there appears to be a large number of lines in the secondary spectrum of hydrogen that are very close to the important lines of neon. If only those lines are taken that differ by less than a quarter of an Angstrom unit (using the measurements of Watson), there are fifty-seven instances. It is not necessary to give all of them, but if the neon lines of intensity 4 and greater be taken it is found that there are twenty instances:—

| Intensity | Neon | Hydrogen | Intensity | Neon | Hydrogen |
|-----------|---------|----------|-----------|---------|----------|
| 9 | 6506.69 | 6506.82 | 4 | 5872.27 | 5872.12 |
| 10 | 6402.43 | 6402.51 | 10 | 5852.62 | 5852.72 |
| 9 | 6383.14 | 6383.20 | 4 | 5760.74 | 5760.58 |
| 5 | 6175.09 | 6175.14 | 7 | 5343.40 | 5343.43 |
| 7 | 6143.31 | 6143.30 | 4 | 5122.40 | 5122.64 |
| 6 | 6096.36 | 6096.21 | 6 | 5080.52 | 5080.73 |
| 6 | 6074.51 | 6074.66 | 4 | 4537.93 | 4537.91 |
| 5 | 6030.20 | 6030.30 | 4 | 3682.37 | 3682.20 |
| 5 | 5975.76 | 5975.68 | 9 | 3520.61 | 3520.60 |
| 5 | 5882.06 | 5882.17 | 6 | 3472.68 | 3472.65 |

Moreover, according to Watson there are only two neon lines of intensity 10, and only four of intensity 9. Of these six principal neon lines, five are paralleled in the secondary hydrogen spectrum, and the sixth line of neon (of intensity 9), 6334.65, is near to a hydrogen one, 6335.53.

There are also fifty-three neon lines that differ from those of the secondary hydrogen spectrum by less than one Angstrom unit and by more than a quarter. This makes 110 lines that are paralleled in the two spectra.

In the case of neon and helium there are also a series of lines that run parallel. Three of these lines were pointed out by Watson (Proc. Roy. Soc., vol. lxxxii., p. 185). He says: "The lines at 6678 and 3447, however, were very bright on the same plate, and it must be concluded that there are two neon lines almost coincident with the helium lines." "There appears to be a similar pair at 4713, though I was unable to obtain a plate on which the neon line alone was present. The wave-lengths of the lines concerned are:—

| | | | | | |
|----|---------|-----|---------|-----|---------|
| He | 6678.37 | ... | 4713.25 | ... | 3447.73 |
| Ne | 6678.50 | ... | 4713.51 | ... | 3447.83 |

And no reason can be at present assigned to their close proximity."

In the case of neon and oxygen, one of the two bright neon lines of intensity 8 and wave-length 5330.90 is very near to a bright oxygen line wave-length 5330.84.

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