

so frequently been referred to by former writers as being present in cholera dejecta; the comma being, in short, nothing more than a segment of one of these vibrios which had become detached during the process used by Koch. It is true that Koch's friends deny that any comma found elsewhere than in the cholera intestine grows under cultivation, in the same way as the one he has described, but so far, this is a mere assertion, not a proved fact; and it is evident that we are but at the commencement of any proper apprehension as to the significance of these vibrios. This is pointed out in an appendix to the Committee's report, and the lines of future investigation into the subject are laid down. But for the present the prevention of cholera can only be found in the prosecution of well-advised sanitary measures, and whilst it is of the utmost importance that labours such as Koch and former investigators have carried out should be continued and put to the most rigid test, yet micro-pathology cannot, at present, be regarded as having made more than a small advance towards the solution of the question under discussion.

A MANUAL OF TELEGRAPHY

A Manual of Telegraphy. By W. Williams, Superintendent of Indian Government Telegraphs, &c. (London: Longmans, 1885.)

A MANUAL compiled to order for the use of the *employés* of the Department—very well written, very well printed, very useful to the Department, and very interesting to the technical reader. It embraces a general description of the apparatus used in India, the faults they experience, and the remedies they apply; a full account of the elaborate system of testing reared under the care of the late Louis Schwendler, the able electrician of the Department; and a clear account of the electrical phenomena which interfere with telegraph working and require watching and removal.

It is supplemented by an excellent *résumé* of the laws which determine the strength of electric currents under various circumstances, and a series of formulæ and mathematical solutions of various problems that occur in practice. It is in reality a primer to an admirable work on "Testing," written by Schwendler and edited by another very able electrician who died in India—R. S. Brough.

It is remarkable how India, practically isolated telegraphically from the rest of the world, originated and maintains a system *sui generis*. It was sown by O'Shaughnessy, it was nursed by Robinson, it is maintained by Cappel. It has had engrafted upon it much of the German element, due to the education of Schwendler in the great house of Siemens; but it remains quite distinct from the rapid system in use in England, and also from that in America—more Continental than English, and American only in its long circuits and sound reading. It has been singularly fortunate in the able officers that have served it, most of whom are highly educated gentlemen selected by competitive examination, and well trained in technical matters before assuming office. The proceedings of our societies, especially those of the Telegraph Engineers, contain frequent valuable communications from India, and this last volume fully maintains the reputation of the Department.

There are some curious errors, particularly among those rocks upon which so many young writers are wrecked, *viz. definitions*.

There is a strange, but excusable, confusion between *electrification* and *potential*, while there is an inexcusable confusion between *current* and *quantity*. Definition 1 says "*electric quantity* is the amount of electricity present in an electrified body," and definition 2 says "the unit of quantity or current is called an "Ampère, Weber, or Oerstedt." Now the unit of quantity is called a *coulomb*, and current is not quantity, but quantity per second, a very different thing, and is called an *ampere* only. It was called a weber, but this term has quite died out since the Paris Congress of 1881, and no one ever called it an oerstedt out of India. The relation between quantity and current is shown by Faraday's great law:—

$$Q = Ct$$

It is a pity that p. 5 cannot be reprinted. Definition 16 is curiously worded: "The unit by which capacity is measured is called a *farad*, or more generally for convenience a *microfarad*." A casual reader would think that the same unit is indifferently called a farad or a microfarad, whereas we learn later on that the one is one-millionth of the other.

At p. 57 we read of a very strange practice. The only cause of errors in the signalling of figures (on which, it must be remembered, the most important issues may depend) is due to a practice, unfortunately too common, known as "exaggerating signals," by which a letter is given more characters than it really possesses: for example, the letter *h*, a most common victim of this ill-treatment, is, by the addition of an extra dot, mutilated into the figure 5. We trust this strange practice is confined to India; we have never heard of it anywhere else.

The *résumé* of laws at p. 241 is very good indeed; but why denominate Ohm's and Kirchoff's laws, and not those of Ampère and Faraday?

The novel practice, in technical books, of printing notes as well as references on the margin instead of at the bottom of the page, has been adopted, and the convenience is certainly very considerable. The printing and get-up of the book are admirable. It should be added to every telegraph engineer's library.

OUR BOOK SHELF

Elements of Inorganic Chemistry. By James H. Shepard, Ypsilanti High School. (Boston: D. C. Heath and Co., 1885.)

THIS little book is evidently intended as a sort of mutual companion of the teacher and student, and is for beginners only, as the author informs us. It is, however, a mixture of elementary and somewhat advanced information on the subject, and certainly would be somewhat difficult for a beginner to be left alone with. The book is well supplied with questions for the student to attempt, and also with suggestions to the teacher as to where questions may be with advantage put. Most of the substances known as elements are mentioned, and their properties to some extent described, even including the so-called rare metals. A chart of "The Natural Classification of the Elements," according to "Mendelejeff," and an appendix on reagents is also included.