

may become a pathogenic organism when by any chance it is introduced into the circulation of such an animal. The culture fluid—blood—and temperature being favorable, it is only a question of superiority by vital resistance on the one hand, or by reproductive activity on the other.

"That harmless species of bacteria may develop pathogenic properties in the manner indicated seems extremely probable; and we should *a priori* expect that such a result would occur more frequently in the tropics, where the elevated temperature and abundance of organic pabulum furnish the favorable conditions required. In this way we may, perhaps, explain the origin of epidemics of pestilential diseases, such as yellow-fever and cholera. If these diseases do not at the present day originate in the manner indicated, they, at all events, have their permanent abiding-place in tropical countries."

Much space is properly devoted to the status of science regarding the individual diseases, and the treatment of them by the author is highly satisfactory. The volume closes with an admirable literature of the subject, for which all students will thank him. But in another edition he should add information as to where the papers of E. C. Hansen can be found. It would be better, also, to give the titles of German papers throughout in the German; and it surely is as needful to mention Schwann and Kützing as Cagniard de Latour, while the failure to record the translation of Schützenberger's work is a serious omission. Aside from these and other insignificant and pardonable errors, the bibliography is very satisfactory. The alphabetical arrangement which has been wisely adopted has one slight disadvantage: we miss the striking evidence of the growth of the subject, which a chronological arrangement such as was employed in the translation of Magnin's book in 1880, and which was in this respect impressive, gave.

On the whole, this book is the most practical, the most complete, and the most useful which we possess upon the subject. It is both a storehouse of principles and a handbook for the laboratory. If a physician or a student, a biologist or a pathologist, can have but one book, this one, because of its lucidity of style, its cool, cautious tone, its breadth and yet its comprehensiveness, and particularly because of its excellent illustrations, is emphatically the one to get. It is deeply to be regretted that Dr. Sternberg cannot be kept busily at work under every favorable condition at the expense of a country to whose service his life has been devoted, and that he is, on the contrary, obliged to write sentences so melancholy as these:—

"All this is admitted, and the experiment is introduced mainly to call attention to a method, which, carefully applied, should enable us to solve the ques-

tion as to the pathogenic rôle of this micrococcus. The writer had mapped out for himself a series of experiments in this direction, and many others relating to etiological questions; but circumstances have not been favorable for the prosecution of experimental work, and he finds himself, somewhat reluctantly, engaged in a review of the field, when it would be far more to his taste to interrogate nature by the experimental method, and thus to aid directly in the solution of these interesting problems" (p. 447).

SCIENTIFIC LINGUISTICS.

Internationale zeitschrift für allgemeine sprachwissenschaft. Herausgegeben von F. TECHMER. Heft 1. Leipzig, Barth, 1884. 16+256 p., 7 pl., illustr. 8°.

THIS new journal appears with an excellent though only partial list of contributors, representing various nations and languages. The articles may be in German, English, French, Italian, Latin, and, under exceptional circumstances, even in some other language; and the international character it is meant to have is perhaps the best justification for its existence. The editor, Dr. Techmer, *privatdocent* at Leipzig, has previously published a work on phonetics; and the most noteworthy article in this number is one by him on the same subject. Most, if not all, of the other articles might well enough have been published in already existing journals. They are all in German, except two in English (together occupying some twenty-two pages out of over two hundred and fifty) and one of about four pages in French. The writers are Pott (*Einleitung in die allgemeine sprachwissenschaft*), Techmer, G. Mallery (*Sign-language*, largely a reprint), Friedrich Müller, Max Müller (a short article in German on a Vedic name which he supposes to be identical with our word 'zephyr,' and to have been originally a name for the setting sun, zephyr meaning the west wind as coming from sunset), L. Adam (*De la catégorie du genre*), Sayce (*The person-endings of the Indo-European verb*), and Brugmann.

Techmer has two articles,—one devoted to the analysis and synthesis of audible speech; the other, to the transcription of sounds; both accompanied by illustrative figures and tables. The former is intended to give briefly what is known on the subject, and to add new contributions. The treatment of vowels is what is likely to interest phoneticians most in this latest work on the subject, especially its position with regard to the English school. It must occasion surprise, not that the English system is rejected, but that the arguments against it are so brief and insufficient; hardly any thing but Bell's work being considered, while

others, who have considerably modified Bell's system, are practically ignored. Sweet ought to have received careful attention; and Sievers surely deserved more than a curt footnote saying that the first edition of his book on phonetics had treated better than the second a certain class of vowels. The vowels meant have not yet been fully observed, but the Russian *jery* is one of them. Observations made several years ago in Leipzig, and renewed very recently in Boston by the writer of this notice, on the sound in question as pronounced by native Russians, are decidedly opposed to the theory accepted by Techmer; and Techmer's own hardly seem to favor it. That theory assumes that the sound is produced by *u*-position of the tongue, and *i*-position of the lips, while the English system makes it a vowel formed with the tongue in the 'mixed' position. In the present state of vowel-analysis, a correct account of this sound is of great importance, and vowels of the same class form one of the most marked features of the English scheme. Now, Techmer himself says he has only been able to observe a special form (*spielart*) of this class of vowels; namely, the Russian sound: and this he marks as formed with partially passive lips, like English vowels, and (sometimes only?)

with an approach toward *mittlere zungenartikulation*. This comes very near the English description of the sound. The whole of Techmer's article is less clear and less interesting than Sievers's work, and makes the impression of resting more on theory than on unprejudiced observation of actual speech. To put, for example, *a* in the centre of the vowel-scheme must seem to many phoneticians a fundamental error. Still, the article contains much that is valuable, and is not to be neglected.

The second article, that on the graphic representation of speech-sounds, is open to objection for the same reasons. The account of English *e* in *err*, and *u* in *but*, certainly needed justification. They are represented as somewhat incomplete varieties of a sound to be classed with German *ö* and *ü*,—a statement which can only be accepted by one who agrees with Techmer as to the place of *a*, if, indeed, by any one. Also the English and American *r* sound ought to have been carefully distinguished from the rolled or trilled *r*'s, as Sievers has done.

If the journal lives, it will certainly contain much valuable matter. It is only to be feared that its rivalry will injure others already established, such as Kuhn's *Zeitschrift*.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Division of the Pacific.—This division includes those parts of California, Oregon, and Washington Territory the drainage of which flows to the Pacific Ocean. An exception is the Lewis Fork of the Columbia River, which rises within the limits of the Great Basin.

The work undertaken in this division is divided into two classes; viz., the investigation of the mining-industries, and the study of the volcanic rocks. As preliminary to the latter, topographic work has been carried on for two seasons in northern California. Some of the details of this work, in the vicinity of Mount Shasta, have already been published.

Examination of quicksilver deposits.—Mr. George F. Becker and his assistants have been engaged in an examination of the quicksilver deposits of California. During the season of 1883 Mr. Becker's personal attention has been devoted to investigations in the vicinity of Sulphur Bank. In August a trip was made to the North Fork of Cache Creek and to Lower Lake, the only localities in that section where fossiliferous strata occur. The latter part of August and early part of September were spent in this section in order to complete the map of

the Clear-Lake region of California. Returning to Sulphur Bank, soundings of the lake were taken, and the final examinations of the mines made, after which the party returned to San Francisco to prepare for the winter's office-work.

In the New Idria district, topographic work in connection with Mr. Becker's work was carried on throughout the whole season by Mr. Hoffmann. The survey was made with the utmost care, and in great detail. Contour lines, eighty feet apart vertically, were run; and intermediate forty-foot contours were interpolated by means of slope-measurements in the steeper parts, and by running curves in the more level portions. The entire area surveyed includes twelve square miles, and the field-work for the map was completed early in 1884.

Geologic work.—Mr. Turner, under the direction of Mr. Becker, undertook an examination of the region in the vicinity of Knoxville, after a trip from Clear Lake to the latter point, during which, notes on the general geology of the line of travel were taken. His work was interfered with by sickness, which obliged him to enter the hospital at San Francisco for treatment. Later in the season, however, he returned to the field, and throughout January, 1884, was busy mapping the formations in the region about Knoxville.