process, the teacher may look at it to see where the form might have been improved, how it might have been curtailed, what steps were superfluous, and so on. So long as any fault in reasoning has to be corrected, it is premature to examine inelegancies. I do not advise correcting too many mistakes at once. It disheartens a pupil to have too many faults found at once. One mistake in each example is ordinarily enough. The faults of reasoning are to be first corrected, then mistakes in work, and, last of all, mere matters of arrangement. I know that this order is distasteful to some pupils, who like first to be told how to put their work down. I recommend the other order: let them first reason out the proposition in the way which they can follow by themselves, and make no mistake about it; then they are able to appreciate the advantage of particular modifications of their process that a more experienced mathematician may suggest to them.

"As an example of what I mean, I may refer to division by a binomial factor, such as $x - a$. A pupil will at first naturally imitate long division in arithmetic; he may then be shown how the abbreviated, or synthetic method, as it is called, is a mere re-arrangement and curtailment of what he has done before; whereas, if he had been taught the shorter method as a rule from the first, it would have been a mere un-understood rule of thumb.

"It has been for a long time my practice, due to a hint from the late Mr. Todhunter, always to require to see an attempt and an exact statement of his difficulty from a pupil, of any problem that he says he is unable to solve, and which appears to me to be within his reach. The reason is, first, that I may see where the precise difficulty is, and so know what it is that I have to explain; and, still more, because in the act of setting forth the difficulty the obscurity has a habit of disappearing. A student may think he is unable to solve a problem because he cannot see his way from the beginning to the end; but he can generally draw some conclusion from the data of the question. I can then give him just the help he needs, whereas otherwise I am liable to explain to him what he really understands, not knowing what it is that stops him.

"The influence of examinations is not wholly bad, as at first sight one might be tempted to think. A teacher who has not the prospect of an examination of his pupils before him is apt to think that it is sufficient if his pupils understand the subject, and that requiring them to reproduce it is superfluous. In this they are liable to lose the great advantage which the necessity of writing out would have given them, and the teacher is extremely likely to credit them with a knowledge that the examination would have shown that they do not possess. As a test of knowledge, then, an examination is useful; nay, it is most valuable. But when the examination is made an end in itself, and when the object aimed at is to produce a semblance of knowledge to deceive an examiner, where the reproduction is made a primary object instead of a secondary one, in subservience to the mental education, then the influence of the examination is mischievous.

"However intelligent and teachable a pupil may be, he will occasionally make mistakes. The commonest forms of these annoying but comparatively innocent mistakes are miscopying either the question or their own work, arithmetical slips, and mistakes with the signs + and −. These mistakes do not always imply ignorance or inattention, and a teacher is unwise to attach too much importance to them: a few of them are quite consistent with a sound appreciation of principle. The effort should be made to undermine the causes of these faults, rather than to correct them when made. The chief of them is hurry. This is a growth of our age which sends down the fibres of its rootlets even to the minutest arrangements of school-life. Set before your pupils that accuracy is preferable to pace; accustom them to the habit of exact speaking and writing, even to the dotting of *i*'s and crossing of *t*'s, — and such faults will largely disappear."

THE STUDY OF LANGUAGE.

HUMAN language is wholly a psychological process. As von Humboldt long ago pointed out, it is nothing innate, but a function; it is no concrete object, but exists only in the soul of the indi-

Die praktische Spracherlernung auf Grund der Psychologie und der Physiologie der Sprache. Von FELIX FRANKE. Heilbronn, 1884.

'Sprachentwickelung, Spracherlernung, Sprachbildung,' von F. TECHMER, in *Dreizehnter Bericht über die höhere Schule für Mädchen zu Leipzig.* Leipzig, 1885.

'On the practical study of language,' by H. SWEET, M.A., in *Transactions of the Philological society,* 1882-84. [The President's annual address for 1884.] London, Trübner, 1885.

Der Sprachunterricht muss umkehren! Ein Beitrag zur Ueberbürdungsfrage von Quousque Tandem (Wilhelm Vietor). Zweite um ein Vorwort vermehrte Auflage. Heilbronn, 1886.

'Techmer's und Sweet's Vorschlage zur Reform des Unterrichts im Englische,' von H. KLINGHARDT, in *Englische Studien,* band x., heft i. Heilbronn, 1886.

German pronunciation: practice and theory. By WILHELM VIETOR. Heilbronn, 1885.

Elemente der Phonetik und Orthoepie des Deutschen, Englischen, und Französichen mit Rücksicht auf die Bedürfnisse der Lehrpraxis. 2d ed. Von WILHELM VIETOR. Heilbronn, 1887.

vidual. In the same way, the language of the individual is to be defined as a psychological activity associated with movements of the organs of speech, — its physiological side. Every individual has his own language, as he has his own ideas; and from analogous causes, as each nation has its own manner of ideal conception, so it expresses the same in its own peculiar way, and also finds different sounds for the physiological form. To learn a foreign language is, accordingly, not merely to acquire a foreign vocabulary whereby to translate one's preconceived notions, but it is to penetrate into a foreign mode of thought which alone is capable of suggesting its own individual form of expression. As Techmer asserts, "He who, in any case, will speak rationally, must think. He who will learn to speak in a particular language, be it English or Chinese, must learn to think in that language."

All language goes back to associations of the perceptions awakened by the different properties of objects. Out of these associations, at first unconscious, in the course of time, are developed conscious, apperceptive associations in series, combinations, and organized systems. These, in their turn, may serve as centres from which are developed the combinations of human speech, — those of form (inflections, etc.) as well as those of meaning (synonymes, etc.). Upon the mass of unconscious associations thus formed depends the practical command of language; on the conscious, apperceptive, and systematic associations, on the other hand, is based the theoretical knowledge of language. It is to be borne in mind that all associations at first conscious through practice acquire the property of working unconsciously. In accordance with what has been said, language-study, then, may be of two kinds. It may be, on the one hand, in order to attain the practical command of a language, that is, we may seek the language as the form of thought; or, on the other hand, it may be to acquire a theoretical knowledge of language, in which case the language becomes the subject of thought. A child, at the outset, learns language only as the form of thought. The development of consciousness is almost identical with the acquisition of language; or, otherwise stated, idea and word are to all intents and purposes acquired conjointly. Later on, the child learns language through language itself, and not only with the ear, but with all the organs of sense. Every new perception finds an expression in language to describe it; and the idea resulting from the perception is so associated with the word, that the word immediately reproduces the idea, and the idea the word. It is also to be noticed that the formulation of rules of language through the tracing of analogy is taking place unconsciously; that learning the language is proceeding within the boundaries of the language itself; and that the acquisition of the spoken language is the only end in view. One principle, originally formulated by Preyer in 'Die Seele des Kindes,' is of importance for its application elsewhere: the healthy child understands spoken language much sooner than it can itself produce by imitation the sounds, syllables, and words that have been heard. Furthermore, only what is interesting and intelligible to the child is firmly impressed upon its mind: all else is in a short time forgotten. Further to be remarked is the fact that the forms of expression learned by the child are simple, unaffected, and idiomatic.

The problem presented in learning a foreign language for practical use is how to obtain, with the least possible expenditure of time and energy, such a complete mastery of the mechanism of the language that it will, as in the case of one's native speech, unconsciously accompany thought, and become its form. That the case as thus stated has its difficulties becomes at once apparent. In the first place, we can have neither the time nor the opportunity to hear or to speak the foreign language that we had in the case of our own. And even if we have, on the one hand, the advantage of being able to think and to reason, and the knowledge of one language system already acquired, it implies, on the other hand, a direct disadvantage: the native language holds fast our thoughts, between which and their forms of expression there is such an intimate union that it will be found difficult at first to make room for new ones. The organs of speech, again, have been accustomed, through constant repetition, to produce without conscious exertion one system of sounds, which the ear through constant hearing has grown able to differentiate with the utmost sharpness. The foreign sounds, on the contrary, produced on an entirely different basis, are not readily differentiated by the ear, and are only to be imitated by careful practice.

A. H. Sayce, several years ago, in an article in *Nature*,[1] wrote, "Our present system of teaching languages . . . is based rather upon empirical haphazard than on scientific principles." The remark is as applicable as ever. In spite of the progress made in recent years in our knowledge of the fundamental laws of language, and particularly of its phonetics, but little has been done, except in isolated cases, to apply in practice what has been scientifically established beyond all question. While all else has advanced, language-instruction has been content to stand still, notwith-

[1] *Nature*, May 29, 1879.

standing the important position already assigned it among the recognized essentials of education. The striking inefficiency of the old method of teaching foreign languages has been proved year after year by barrenness of result; but nevertheless, if popular text-books are a criterion, language is still taught in the same old way. An attempt is made to learn it only consciously, and letters and the literary language are falsely regarded as synonymous with sounds and the spoken language. Worse than all, with the old method of translation, the foreign language has been studied within the native language; and, while foreign words and forms have indeed been taught, no attempt has been made to teach or to learn with the foreign language the foreign mode of thought.

It is Sayce, again, who affirms axiomatically that language consists of sounds, and not of letters. Sweet, too, insists no less strikingly that language-study is concerned not with dead letters, but with living speech. It is accordingly the spoken form of every language that should form the basis of its study, which should furthermore proceed from the stand-point of the sentence, and not from that of the word. Upon these fundamental points all recent writers on the study of language are substantially agreed. With one exception, the writers cited above would, however, eliminate from the question the factor which I have called the theoretical knowledge of language, and would make its practical command the one end in view. Techmer alone regards the practical acquisition of a language of primary importance, but would base upon it theoretical study with the idea of making the knowledge of the new language more perfect and firmly fixed. What is here of less weight from its bearing on the subject is his characterization of this theoretical study of language as "an educational means of bringing the harmonious and homogeneous development of the mind to its highest possible perfection." The true place which the theoretical study of language should hold is best of all stated by Storm, in his 'Englische Philologie' (Heilbronn, 1881). He would neither eliminate it entirely, on the one hand, nor would he give it undue prominence, on the other. The theoretical, he maintains, is practical in a higher sense, because it facilitates the comprehension and acquisition of the facts.

The pronunciation of a foreign language should form the first stage of its instruction, and this can only be taught on the basis of scientific phonetics. Whether the instruction should proceed at the outset through the medium of phonetic transcription, is a point upon which not all writers are agreed. Techmer, in the light of his own experience, is against it. Sweet is outspoken in favor of it: he would entirely discard the ordinary orthography, and substitute for it one purely phonetic; and in this dictum he is followed by many others. Vietor has practically applied this theory to German for English learners in his 'German pronunciation,' which is worthy of a wider distribution than it has thus far had in this country: even if it is found impracticable to use it in its entirety as a text-book in the class-room, its material will prove of the utmost value for the wealth of suggestion that it contains. Unproductive as is our whole present system of language-teaching, this matter of pronunciation, which recent writers on the subject almost with one voice maintain should be a foundation principle, is, nevertheless, the weakest element of all. The ordinary text-book gives at the beginning a few pages on pronunciation, unscientific in character, and consequently imperfect and inexact, and utterly inadequate even with constant and painstaking iteration, as every teacher knows, to convey the information desired. In learning the sounds of a foreign language, the course to be followed is from simple sounds to syllables, to words, and finally to sentences. With words and sentences, meanings are also to be associated: such sentences should, further, be the natural sentences of language, which are precisely the ones that cannot be constructed *a priori*. There is no place in language-instruction for Ollendorffian sentences like "The merchant is swimming with the gardener's son, but the Dutchman has the gun."

When the foreign sounds and sound-complexes have once been thoroughly mastered, and not until then, a reading-book, containing connected texts written in the simplest and most colloquial style, and embodying as few infrequent words and phrases as possible, is to form the main foundation for the study of the new language. Sweet expresses himself most definitely as to the arrangement of such a book. It should have, first, descriptions of nature and natural phenomena, of the different races of men, their dwellings, food, and dress, because the elementary vocabulary of material things, phenomena, and actions, is most easily embodied in descriptions of this character; narrative pieces come next; and, lastly, idiomatic dialogues, and longer pieces which combine all three elements. These texts should be, it is hardly necessary to state, both interesting and entertaining, in order perfectly to fulfil their purpose. At the end of this stage of the instruction the learner will have an easy command of a vocabulary, not wide, it may be, in range, but thoroughly prac-

tical in character, and adequate to express the most necessary ideas. The next stage is to consist of condensed treatises on special subjects, such as history, geography, and natural science, after which the learner may gradually choose his texts with increasing freedom, until he is finally able to read the actual literature of the language itself in its original form.

The reading of texts, however, is not the only element of instruction: during this whole time the systematic study of grammar, idioms, and vocabulary is to accompany and run parallel with the reading. As to the true position of grammar in the study of language, there is but one mind. It should be studied immediately in connection with the texts, and, furthermore, inductively. Sweet puts it best of all when he says that "grammar, which is merely a commentary on the facts of language, must follow, not precede, the facts themselves, as presented in sentences and connected texts." But neither he nor the others mean that its systematic study should be deferred longer than the stage when the learner is able to master phonetically the sentences that are given to him. Klinghardt expressly states, that, in his opinion, a purely inductive method of teaching grammar is only suitable at the very beginning, — a dictum in which all practical teachers will concur. Later on, a short grammar, to be learned systematically, should be placed in the hands of the pupil. It should include, however, nothing that is not required for the explanation of the texts, and every rule should have its example. Still later the advanced student might be given a reference-grammar, which should contain all rules.

Vocabulary may be studied with regard to the meanings of words either analytically or synthetically: that is, the word 'good,' for instance, may be taken through its various meanings, — 'pleasant to the taste,' 'useful,' 'morally good,' etc.; or else the idea, for instance, of 'morally good,' may be taken, and the various words and phrases by which it is expressed, like 'virtue,' 'bad,' 'vice,' may be enumerated. The synthetic method thus includes the whole vocabulary of a language. Word-lists are on no account to be studied. Connected sentences, as already stated, should be the medium of instruction. A word has already been said in regard to the study of idioms. Only necessary idioms should at first be taught. For conversational purposes, questions are more necessary than answers; the former, then, should be mastered perfectly, while the latter require merely to be understood.

In the system here elaborated no place is provided for the old mechanical translation method or the grammar calculated to accompany it. A reading knowledge of a language may doubtless be obtained at the expense of a great deal of labor and time by translating foreign texts. The direct benefit, however, of such a process, is to increase one's own native vocabulary and command of language, — a result, no doubt, admirable in its way, but exactly the reverse of the end desired. A greater evil still arises from giving a learner the literature of a language, be it modern or classical, before he knows its vocabulary and grammar. "What," Sweet pertinently inquires, "should we say of a music-master who gave his pupils a sonata of Beethoven to learn the notes on, instead of beginning with scales?" This very course is nevertheless pursued in our present method of teaching languages. Its effect is often not only to blot out absolutely the beauties of the literature thus unfortunately chosen for sacrifice, but to foster a disgust for literature generally. It would have been a thousand times better for the general culture of the pupil to have given him by and by a good translation. There are many persons whose only idea of foreign literature is an uncomfortable road beset with veritable sloughs of despond, out of which it is only possible to climb with the constant aid of grammar and dictionary.

It is Sayce, already quoted, who points out that the grammar of a living language, like the life of the community itself, is constantly in process of change and development. It cannot, accordingly, be held in by rules that, once made, are to stand forever, as unalterable as the laws of the Medes and Persians. Yet, notwithstanding this indisputable fact, there are still in use numerous text-books whose prototype is the old grammar of Donatus. Such a grammar may possibly have its use as a book of reference, but surely not otherwise. You may know your grammar by rule and paragraph from first to last, and be able to apply it in the formation of sentences, but at the same time be utterly unable to form a single sentence as a native would speak it. The old method is really the study of the grammar by means of the language, as if the former, and not the latter, were the end in view.

In the case of the dead languages the instruction should proceed, as far as possible, on the plan laid out for the living ones; and many recent writers are agreed that the study of Greek and Latin should follow rather than precede the modern languages.

Against the so-called 'natural method,' Sweet takes a decided stand. The very term, he says, is a misnomer, for the learning of a foreign language is as unnatural a process as can be imagined. The genuine natural method, which, if any thing,

would be that followed by nurses and children, is definitely characterized as bad, and, from its wastefulness and absence of system, unworthy of imitation later on. Under the most favorable circumstances, the method is more or less a failure, and the result cannot but be infinitely less productive in the later study of a foreign language, where it is impossible to reproduce those conditions. A language cannot be picked up by ear without systematic study. Even a residence in the foreign country before the elements of the language have been mastered, so far from being advantageous, is positively injurious, as the learner is forced, by the exigences of the moment, to make use of incorrect constructions, which are afterward difficult to get rid of. Klinghardt characterizes Techmer's system, in so far as it concerns the practical acquisition of language, as an example of the 'rationally developed natural method.' There is here, however, a confusion of terms. Techmer does not concern himself solely with the practical acquisition of language, but makes its theoretical study an important and indeed an essential element. The Montaigne-Sauveur method is distinctly stated by him to take but little account of the theoretical knowledge of language. He might have stated with greater fairness that it takes no account of it at all.

In the foregoing, particular stress has purposely been laid upon the views of Techmer and Sweet, as their importance justly demands. While far apart at some points in the development of their respective systems, the two are nevertheless wholly at one in fundamental principles. Techmer, as Klinghardt notes, shows in his treatment of the question the traditional peculiarities of his nation. He begins, in a sense *ab ovo*, with a psychological consideration of language in general, considers the subject carefully in its whole extent, and makes, rightly, the ideal side, the theoretical knowledge of language, both a prominent means and an aim of acquisition. Sweet, on the contrary, sees the question only from its practical side. He does not attempt to give a systematic exposition of the whole question of language, but, convinced that the aim of language-study should be wholly a practical one, develops with admirable rationalness and common sense a system whose mere practicality cannot be disputed. He leaves a place also for theoretical knowledge, but would make it an end in itself, in that he would place it beyond and above the practical acquisition of a language. Particularly valuable is Sweet's vindication of scientific phonetics as a basis of linguistic study.

However the writers here cited may differ in single points of detail after the first stages of instruction have been passed, all with one accord cry out, with a voice that ought not to fall unheeded, for the reform of existing methods. Vietor is right: 'Der Sprachunterricht muss umkehren!' In what essential points it may be reformed has here been pointed out as much in detail as space would permit. In accordance with what has been said, — as Klinghardt puts at the beginning of his article, — language-instruction must apply, as far as possible, the certain results of modern philological investigation. Secondly, grammar is to be at first studied inductively and in connection with the reading texts: when a systematic grammar is finally taken up, it is to be, as much as possible, limited in extent. Finally, instruction must proceed from the stand-point of the spoken language and the sentence. Reform in the teaching of the foreign languages, ancient or modern, cannot, perhaps, be expected to come all at once, or to come of itself. Old practices are too deeply rooted for the exertions of a few thus easily to overturn them; but surely there is nothing inherent in the old method, that it should be retained if something better can be found to take its place. If the results of present methods of instruction, whether in school, academy, or college, are to be taken as a standard whereby to judge of their efficiency, then reform is needed here as in no other place in the curriculum. The matter has been viewed too long with indifference. The old method is inadequate to supply what is demanded of it. Time that can ill be spared, and the drudgery of hard labor, are spent upon it; and the result, in nine cases out of ten, is now what it always has been, — practically nothing! When existing methods, be they educational or economical, are bad, the rational way is to discard them. If they are bad in part, then discard them in part; if bad throughout, then reject them utterly.

Wm. H. Carpenter.

The *Athenaeum* states that Mr. H. Howorth, M.P., the historian of the Mongols, is going to bring out a work entitled 'The mammoth and the flood,' in which he endeavors to prove that a wide-spread cataclysm brought the mammoth period to a close, and that this catastrophe involved a wide-spread flood of water which not only drowned the animals, but buried them, sometimes with their bodies intact, and in many cases along with a crowd of very incongruous beasts, and covered them with continuous mantles of loam and gravel.

— The international astronomical society, Astronomische Gesellschaft, meets this year at Kiel on Aug. 29.