DISCUSSION AND CORRESPONDENCE.

PHYSIOLOGICAL EFFECTS OF DIMINISHED AIR PRESSURE.

To the Editor of Science: In a communication published in Science for November 1 (p. 696), Mr. H. H. Clayton, of Blue Hill Observatory, gives some observations on the number of his pulse-beats, noted during a recent ascent of Pikes Peak by railroad. The pulse increased from 78 beats per minute at Manitou (6,662 ft.) to 92 at the summit of the mountain (14,147 ft.). Mr. Clayton's note recalls some similar observations made by the writer in Peru in 1897, during two ascents of El Misti (19,200 ft.), then the site of the highest meteorological station in the world, established by Professor S. I. Bailey, and operated by the southern station of the Harvard College Observatory at Arequipa. Both ascents were made on mule-back, so that no physical exertion was necessary. The first ascent was on October 7, the start being from the Observatory (8,050 ft.) on October 6. Although provided with clinical thermometers and with a sphygmograph, the writer suffered so severely from mountain sickness that he made very little use of his instruments. His temperature at 5:30 p. m., October 5, twelve hours before leaving Arequipa, was 98°.4; his respiration 24, and his pulse 90. On the summit of El Misti the body temperature was 96°.4; the respiration 34, and the pulse 110. Twelve hours after arrival at Arequipa the figures were 98°.0, 24 and 85 respectively. A rather unsatisfactory sphygmograph curve was obtained on the summit.

The second expedition to El Misti was made on November 9, 1897, and on this trip the writer suffered much less from mountain sickness than on the previous one. At an altitude of 15,700 ft. a short walk of about 100 yards was taken to the instrument shelter. Two stops were necessary on the way, to get breath. An hour after this exercise, the pulse was 128, the body temperature 97°.0, and the respiration 30. The corresponding figures twelve hours before leaving Arequipa were 91, 98°.6 and 20. The night was spent at 15,700 ft. The body temperature immediately after waking in the morning was 96°.2; the pulse 112, and the respiration 30. Twenty minutes after reaching the summit, the temperature was 97°.2, the pulse 120, and the respiration 32. In an hour and a half the respiration was 35, the pulse and temperature remaining the same. In two hours the temperature was 96°.8, the pulse 112, and the respiration 34. Three fairly good sphygmograph curves were obtained on the summit. These curves possess some interest as being, so far as I have been able to learn, the first, with possibly one exception, to be secured at so great an altitude as 19,200 ft. At any rate, no curve from so great an altitude was reproduced until a copy of one of these tracings from the Misti summit was printed in an article by the writer in the *Journal of the Boston Society of Medical Sciences* for June, 1898.

On the second expedition to El Misti the descent was begun two hours and a half after reaching the top. At the hut at the base of the mountain (15,700 ft.), after walking to and from the shelter, the pulse was 130, but the respiration had decreased to 30. One hour after arriving at Arequipa the temperature was 98°.2, the pulse 116, and the respiration 22, and twelve hours after arrival the pulse had fallen to 82—about the writer's normal at the Observatory—and the respiration to 22, the normal being 20.

In counting the pulse on the summit it was quite unnecessary to place the finger on the wrist. The heart-beats could plainly be *heard*.

R. Dec. Ward.

Harvard University,
November 2, 1901.

PRACTICAL AMELIORATIONS OF ENGLISH GRAMMAR.

Every year or so a 'practical grammar' of our mother-tongue is announced as on the eve of publication, and, when the book appears, every teacher and student who had been hoping for some real progress in ridding the language of the impedimenta of barbarism and the useless paraphernalia inherited from classical schematism, experiences a keen sense of disappointment.

Perhaps the greatest intellectual feat so far accomplished by English-speaking peoples all over the globe has been to free their mind-tool so largely from the shackles of grammar. So much having been done already in this direc-

tion, we ought to make further advances toward ideal speech. All such advances will serve English well in the struggle for adoption as the world-language, for the more cosmopolitan, the less grammatical, in the classical sense, must it be.

It needed no prophet to foretell the fate of Latin as a would-be international tongue. In the nature of the case, it could never be more than the artificially propagated and sustained speech of more or less extensive and widely scattered societies, cliques, clubs and associations (political, religious, scientific, etc.), for the mind of the Aryan and Semitic races was capable of something higher than speaking through a death-mask, and other populous nations have also to be reckoned with—nations like the Chinese, Japanese, Malays, Hindus—who cannot be expected to welcome a dead language over against a live one. Evolution, too, has written a like epitaph over Greek, which some enthusiasts would fain have us accept as a universal language. No such backward step is probable or even possible. Against all competitors in the field, English is favored by its increasing degrammatization and the open hospitality it extends to new words from every language under heaven.

Phonetic spelling must triumph in the end, and as complete a victory waits also for free speaking and free writing—*i. e.*, language untrammeled by grammatical artificialities. Not a backward-looking Volapük, but English with its face to the future foreshadows the true world-language. Phonetic spelling has already made a good beginning, which suggests the possibility of similar intentional reforms in English grammar. The present writer will content himself with specifying certain ameliorations of grammar, which, perhaps, may serve, like the ten 'rules' for amended spelling proposed in 1883 by the English and American Philological Associations, or the list reported by the American Committee in 1886, as starters for more ambitious movements of reform.

The list is as follows:

1. Drop the so-called *subjunctive mood* altogether. It is moribund in much of our best prose, and can be allowed to die out of our poetry with no injury to rhyme or reason, strength or beauty.

2. Drop *inflected forms for the past tense and past participle*, making all new verbs, whether introduced from foreign tongues or made within the language itself, conform to the type of *hit*, *let*, etc. In America, in particular, drop *gotten*.

3. Avoid the use of *differing forms for verb and noun*. Follow the model of *boycott*, under 'rule' 2.

4. Avoid the use of *plural forms of nouns*, making all new substantives, whether borrowed from other languages or born of the mother-tongue, conform to the model of *sheep*, *deer*, etc.

5. Avoid the use of *Greek or Latin names for 'new things.'* Follow the good example of certain scientists, and name them after their discoverer, the place of origin, etc. Make new words here conform to the model of *gatling*, *ampere*, and the like.

6. Avoid the use of *feminine forms of nouns* previously employed with reference to males, letting the thought control the grammar. Drop particularly *authoress*, *poetess*, etc.

7. Avoid forming *adverbs by inflection*, using for all new words of this class the same form for adjective (or other word) and adverb.

8. Omit the conjunction *that* wherever possible. For example, in such cases as 'I know *that* he is dead.'

9. Use *but* and *as* as full-fledged prepositions.

10. Drop *whom*, using *who* for both cases.

11. Ceasing the attempt to distinguish between *who* and *that*, and *that* and *which*, let the fittest survive in each instance.

12. Use the pronouns compounded of *self* and their plurals, both as subjects and objects.

13. Drop the *apostrophe* in the *possessive case*.

Other suggestions might be made, but these cover sufficient ground for the present.

ALEXANDER F. CHAMBERLAIN.
CLARK UNIVERSITY, WORCESTER, MASS.

SHORTER ARTICLES.

CATALASE, A NEW ENZYM OF GENERAL OCCURRENCE.

THE study of the enzyms has been pursued with growing interest by a number of scientists during later years. These unorganized ferments being substances of a highly ephemeral