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,
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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-