syllables of *utter*, and with a resonating sound no such silence could supervene in the brief period which the voice actually employs. Indeed all voiceless occlusives such as *p*, *t*, and *k* in "stop, please," "not to be" and "book-keeping" would be impossible on the hypothesis of resonance, because internal vibrations must continue the sound for a brief period until damping is effective. "It is precisely the *absence* of resonance that make the voiceless occlusives possible."

The author contends that Helmholtz should have rejected the hypothesis of resonance when in his fourth edition (1877) he ceased to regard the otoliths as the occasion of noise. But some recent investigations, notably those recorded by the physiologist Parker¹ and the physicist Stewart,² have brought forward evidence that perhaps the cochlea is not the only seat of hearing. If noise is not a phenomenon of resonance, a crucial instance for the complete overthrow of the resonance hypothesis must be sought with reference to the sensation of tone.

Perrett's discussion, though seemingly well informed, is marred by flippancy of style and the frequent introduction of "smart" terms of speech. The effectiveness of the argument is thus seriously impaired by an egregious trifling.

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Theorie der Konsonanz und Dissonanz. (Schriften zur Anpassungstheorie des Empfindungsvorganges. 2 Heft.) JULIUS PIKLER. Leipzig: Barth, 1919. Pp. 34.

In place of the excitation theory (Erregungstheorie) of sensation, the author advances a theory of adjustment (Anpassungstheorie), in accordance with which the apprehension of sensation involves a relational activity on the part of the mind. In the phenomena of consonance the author traces the effects of an adjustive attitude which is but an expression of the general principle of self-preservation. With this principle as a foundation he proceeds to distinguish sharply the method of apprehension on an arithmetic basis from apprehension on a geometric basis; the latter possessing the natural significance which endows musical consonance with its peculiar effectiveness, since it consists in measuring all tones with reference to a fundamental.

Just as a comparison of lines visualized is furthered and made

¹ G. H. PARKER. A Critical Survey of the Sense of Hearing in Fishes. *Proc. Amer. Phil. Soc.*, 1918, 57, 69 ff.

² G. W. STEWART. Binaural Beats. *Psychol. Monog.*, 1918, 25, No. 108, pp. 31 ff.

pleasing whenever one line reappears as a fractional part of the other—so that the one may be said to involve the other—two tones are consonant whenever one of them recurs in the other. This is most notably the case in the octave where the upper note is essentially a doubling of the lower note. But it is also the case in the fifth where the upper note is analysed as the lower note plus one-half ($1 : 1 + \frac{1}{2} = 2 : 3$), and in the major third where the upper note is again the lower note plus one fourth ($1 : 1 + \frac{1}{4} = 4 : 5$). Beyond this the consonance of a single interval does not extend. Although the same principle would seem applicable in the case of the whole tone, $8 : 9$ and the quarter-tone, $16 : 17$, as a matter of experience we fail to hear these intervals geometrically, because with such small differences, an arithmetic means of apprehension appears to be easier. The fourth, although essentially dissonant, may possibly be heard geometrically as half the fall of the higher to the lower tone of the octave; similarly the minor sixth ($5 : 8$) may be apprehended as a fall from the upper to the lower tone diminished by a quarter. The apparent consonance of the minor third and the major sixth are explained with reference to their positions in triads. For example, the minor third, when taken singly is dissonant, but it becomes musically useful in combination with the major third and the fifth where it occurs as a natural consequence of combining these two consonant intervals. It is, however, a mistake to regard the triad as a fundamental element in consonance, for in reality it is only the simplest and most immediate means of resolution for a dissonance.

In order to deal justly with Pikler's theory one should doubtless consult his larger work (*Sinnesphysiologische Untersuchungen*) to which frequent references are made in the pamphlet under review. Unfortunately this book is not yet available to the reviewer, and therefore no extended criticism of the foundations upon which his theory of relational apprehension rests, is here possible. One may venture to say, however, that although the author refers in all cases to the immediate experience of intervals as the basis of his conclusions, and thus even goes so far as to exclude the fourth and the major sixth from the ranks of consonance, although hypothetically they might be justified as representing one third and two-third "doublings" of the fundamental, there is no indication that he has analyzed his tones so as to inform us just what is "doubled" in the octave, or "half-doubled" in the fifth. The analogy with the visual apprehension of straight lines of different lengths is hardly convinc-

ing unless we know what precise dimension or attribute of the tone is under consideration in judgments of consonance. The application of geometrical and arithmetical conceptions is apt to be more confusing than helpful unless it be first grounded upon judgments of liminal variation. And although it has been demonstrated that the discrimination of pitch tends to follow an arithmetical series of vibrational increments while discriminations of volume follow a geometrical series, it by no means follows that either the pitch or volume dimension of the sound can be quantified. While all would agree that the two tones of an octave possess a common quality, to go farther and state that this common feature or *Selbigkeit* is explained by the fact that the upper note doubles the lower one appears to the reviewer somewhat naïve.

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The Psychology of Musical Talent. C. E. SEASHORE. Boston: Silver, Burdett, 1919. Pp. xvi + 288.

"This monograph is addressed to students of applied psychology. By content, it appeals directly to those who are interested in music." It is a presentation of "the psychology of musical talent, an account of the musical mind. This subject is treated from both the theoretical and the practical point of view, the aim being to describe and explain the musical mind in such a way as to serve in the recognition, the analysis, the rating, and the guidance of musical talent." "Our approach is that of experimental study."

If we turn to the body of the book, we find that the first chapter gives the following inventory of the factors in musical talent: I. Musical sensitivity, which consists of simple forms of impression,—the senses of pitch, intensity, time, and extensity; and complex forms of appreciation,—the senses of rhythm, timbre, consonance, and volume. II. Musical action,—the natural capacity for skill in accurate and musically expressive production of tones in the control of pitch, intensity, time, rhythm, timbre, and volume. III. Musical memory and imagination, which includes the sub-headings auditory and motor imagery, creative imagination, memory span, and learning power. IV. Musical intellect, consisting of musical free association, musical power of reflection, and general intelligence. V. Musical feeling, comprising musical taste, emotional reaction to music, and emotional self-expression in music. In so far as experimental technique has developed sufficiently,