

| | | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|------|
| <i>M</i> | 3010 | 2550 | 2480 | 2410 | 2440 | 2410 | 2240 | 2240 | 2390 | 1690 |
| <i>W</i> | 3310 | 3070 | 2990 | 2850 | 2810 | 2710 | 2680 | 2670 | 2780 | 1960 |
| <i>Ch</i> | 3730 | 3600 | 3570 | 3320 | 3170 | 3180 | 3310 | 3260 | 3360 | 2160 |
| | | | | | | | | | | |
| <i>L</i> ₁ | -4 | -3 | -2 | -1 | -1 | 0 | -1 | -3 | -1 | -5 |
| <i>L</i> ₂ | -24 | -23 | -17 | -12 | -5 | -7 | -12 | -19 | -10 | -15 |
| <i>L</i> ₃ | -28 | -27 | -24 | -22 | -28 | -34 | -34 | -43 | -27 | -20 |

the way individuals speak the
 or F_3 and the relative amplitudes
 have correspondingly large varia-
 tions. Part of the variations are
 differences between classes of speakers,
 and children. In general, the chil-
 dren's highest in frequency, the women's
 the men's formants are lowest in

may be observed in the averaged
 given on Table II. The first for-
 mant are seen to be about half an
 octave those of the men, and the second
 are also appreciably higher. The
 amplitudes of the formants did not
 differ between classes of speakers,
 averaged all together. The formant
 referred to the amplitude of the first
 in the total phonetic powers of the
 so as to be related to each other by
 given by Fletcher.¹⁸

of correlating the results of the
 the formant measurements have
 terms of the first two formants the
 relationship is illustrated in Fig. 9. In this
 for all vowels of both callings are
 all members of the listening group
 taken. Since the values for the men
 generally lie at the two ends of the dis-
 tribution, the confusion between vowels
 in their data; thus the measurements
 for speakers have been omitted.

9 are the same as the boundaries
 indicated previously, some vowels
 in agreement much more frequently

The plot has also been simplified by the omission of
 [ɜ]. The [ɜ] produces extensive overlap in the [u]
 region in a graph involving only the first two formants.
 As explained previously, however, the [ɜ] may be
 isolated from the other vowels readily by means of the
 third formant.

When only vowels which received 100 percent recog-
 nition are plotted, the scatter and overlap are some-
 what reduced over that for all callings. The scatter is
 greater, however, than might be expected.

If the first and second formant parameters measured
 from these words well defined their phonetic values;
 and if the listening tests were an exact means of classi-
 fying the words, then the points for each vowel of

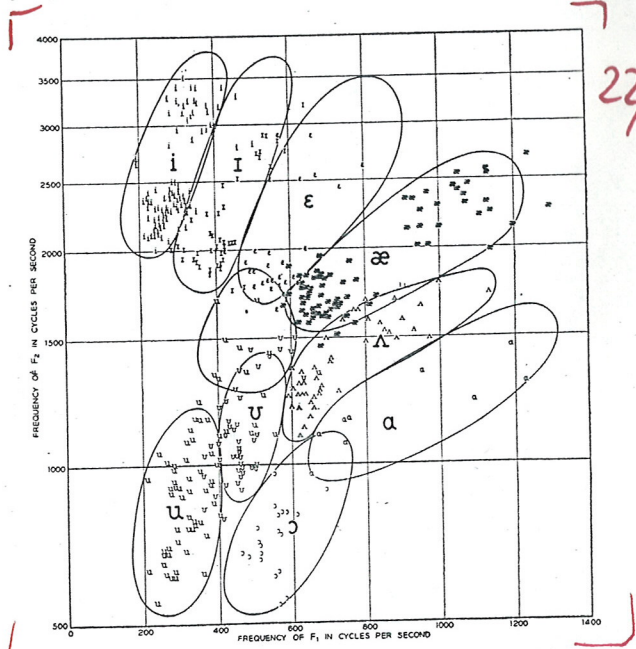


FIG. 9. Frequency of second formant versus frequency of first
 formant for vowels spoken by men and children, which were
 classified unanimously by all listeners.

and Hearing (D. Van Nostrand Company,
 p

G.E. Peterson & H.L. Barney:
 JASA 24 (1952) 175-184, p. 183