

A NEW LOOK AT THE PARTCH MONOPHONIC FABRIC

by George Secor

A New Notation

Harry Partch never solved the problem of devising a good master notation for his 43-tone just scale. Instead he had to rely on tablatures and the cumbersome ratios. A completely consistent staff notation for the Partch system is possible, however, which is based entirely on the ratios and therefore is unrelated to any tempered notation. It is constructed on the following set of principles: 1) always notate 5:4, 6:5, 7:6, 9:7, and 11:9 as intervals of a third; 2) notate 1/1 as a G, and notate the remaining six tones in Pythagorean relationship to 1/1 on the appropriate lines and/or spaces without using any sharps or flats; use a natural sign, if needed, to cancel another symbol; 3) divide the remaining ratios into three groups on the basis of the highest prime number present in the ratio; subdivide these three groups into six groups on the basis of whether the highest prime is in the numerator or denominator of the ratio; 4) assign a symbol to each of the six groups; this symbol is to be placed in front of each note belonging to its group; 5) a letter name and a symbol serve to identify unambiguously each of the 43 tones in the Partch Monophonic Fabric:

	♩	☆	★	◇	◆	⊠	⊡
G	1/1	160/81	81/80			33/32	64/33
A	9/8	10/9	16/15	21/20	8/7	11/10	12/11
B	32/27	5/4	6/5	7/6	9/7	11/9	
C	4/3		27/20	21/16	10/7	11/8	14/11
D	3/2	40/27		7/5	32/21	11/7	16/11
E	27/16	5/3	8/5	14/9	12/7		18/11
F	16/9	15/8	9/5	7/4	40/21	11/6	20/11

A New Visualization

A grid visualization of the Partch Monophonic Fabric appears on the following page. Three notations are given for each tone: 1) a ratio; 2) the new just notation; 3) and the 41-tone equivalent notation. True 3:2 relationships between tones are indicated by straight horizontal lines, while true 5:4 relationships are indicated by straight vertical lines. False 3:2 or 5:4 relationships are indicated by jagged lines.

A New Keyboard

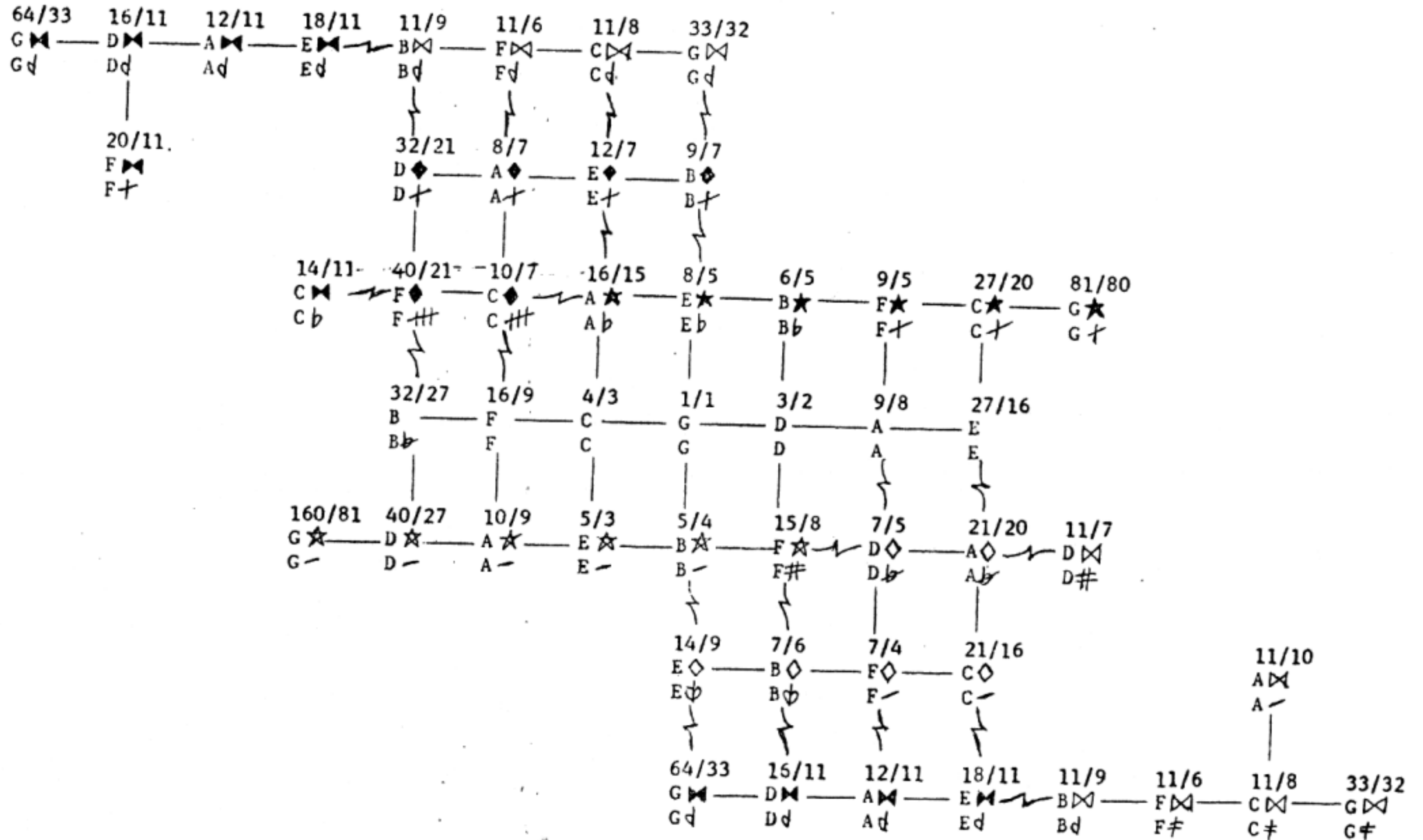
If a keyboard is arranged to control tones as indicated in the upper half of the second page following, homogeneous fingering patterns will be achieved in all keys, and approximately just intervals will also occur in the same patterns as their just counterparts. If it is desirable to fill up the empty spaces with keys, duplicate keys may be added as in the lower half of the page. It is also possible to arrange the tones of the 31-, 41-, and 72-tone equal temperaments on this keyboard so that all intervals are fingered homogeneously not only within each system but also from one system to another!

A New Temperament

If the above keyboard is tuned so that each key plays 116.69 cents different in pitch from the one beside it, a temperament will result in which none of the 29 primary ratios within the 11-limit will be more than about 3.32 cents false. With 43 tones per octave, this permits 21 complete tonalities and 21 complete utonalities!

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GRID VISUALIZATION OF THE PARTCH MONOPHONIC FABRIC




A KEYBOARD FOR THE PARTCH MONOPHONIC FABRIC

Placement of Tones according to 72-tone Matrix

										$\frac{160}{81}$		
$\frac{160}{81}$						$\frac{40}{27}$			$\frac{20}{11}$	$\frac{64}{33}$		$\frac{10}{9}$
$\frac{64}{33}$		$\frac{10}{9}$	$\frac{32}{27}$	$\frac{14}{11}$		$\frac{16}{11}$	$\frac{14}{9}$	$\frac{5}{3}$	$\frac{16}{9}$	$\frac{40}{21}$		$\frac{12}{11}$
$\frac{40}{21}$		$\frac{12}{11}$	$\frac{7}{6}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{10}{7}$	$\frac{32}{21}$	$\frac{18}{11}$	$\frac{7}{4}$	$\frac{15}{8}$	$\frac{1}{1}$	$\frac{16}{15}$
$\frac{15}{8}$	$\frac{1}{1}$	$\frac{16}{15}$	$\frac{8}{7}$	$\frac{11}{9}$	$\frac{21}{16}$	$\frac{7}{5}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{12}{7}$	$\frac{11}{6}$		$\frac{21}{20}$
$\frac{11}{6}$		$\frac{21}{20}$	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{9}{7}$	$\frac{11}{8}$		$\frac{11}{7}$	$\frac{27}{16}$	$\frac{9}{5}$		$\frac{33}{32}$
$\frac{9}{5}$		$\frac{33}{32}$	$\frac{11}{10}$			$\frac{27}{20}$						$\frac{81}{80}$

Duplicate Keys Added to the Above according to 41-tone Matrix

										$\frac{160}{81}$	$\frac{21}{20}$	$\frac{9}{8}$
$\frac{160}{81}$	$\frac{21}{20}$	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{9}{7}$	$\frac{11}{8}$	$\frac{40}{27}$	$\frac{11}{7}$	$\frac{27}{16}$	$\frac{20}{11}$	$\frac{64}{33}$	$\frac{33}{32}$	$\frac{10}{9}$
$\frac{64}{33}$	$\frac{33}{32}$	$\frac{10}{9}$	$\frac{32}{27}$	$\frac{14}{11}$	$\frac{27}{20}$	$\frac{16}{11}$	$\frac{14}{9}$	$\frac{5}{3}$	$\frac{16}{9}$	$\frac{40}{21}$	$\frac{81}{80}$	$\frac{12}{11}$
$\frac{40}{21}$	$\frac{81}{80}$	$\frac{12}{11}$	$\frac{7}{6}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{10}{7}$	$\frac{32}{21}$	$\frac{18}{11}$	$\frac{7}{4}$	$\frac{15}{8}$	$\frac{1}{1}$	$\frac{16}{15}$
$\frac{15}{8}$	$\frac{1}{1}$	$\frac{16}{15}$	$\frac{8}{7}$	$\frac{11}{9}$	$\frac{21}{16}$	$\frac{7}{5}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{12}{7}$	$\frac{11}{6}$	$\frac{160}{81}$	$\frac{21}{20}$
$\frac{11}{6}$	$\frac{160}{81}$	$\frac{21}{20}$	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{9}{7}$	$\frac{11}{8}$	$\frac{40}{27}$	$\frac{11}{7}$	$\frac{27}{16}$	$\frac{9}{5}$	$\frac{64}{33}$	$\frac{33}{32}$
$\frac{9}{5}$	$\frac{64}{33}$	$\frac{33}{32}$	$\frac{11}{10}$	$\frac{32}{27}$	$\frac{14}{11}$	$\frac{27}{20}$	$\frac{16}{11}$	$\frac{14}{9}$	$\frac{5}{3}$	$\frac{16}{9}$	$\frac{40}{21}$	$\frac{81}{80}$
$\frac{16}{9}$	$\frac{40}{21}$	$\frac{81}{80}$										



ANOTHER MATTER in the same article which does not seem to be adequate is my description of a small-error temperament for the Partch system. I must confess that both time and page space were running out, so the description turned out to be rather sketchy. Also, my figure for the generating interval was not quite correct, so let me start anew.

The keyboard arrangement shown in the article is intended to accommodate scales generated by an interval similar in size to 16:15 or 15:14. If this interval is adjusted so that carrying it out nineteen places will generate a pure 18:5 with the starting tone (i.e., 9:5 increased by an octave), then its value in cents is $(1017.596288 + 1200)/19 = 116.7155941$. This makes the intervals 9:8 and 5:4 false by 3.323 cents; altering the value slightly will improve one and worsen the other. No other primary interval in Partch's 11-limit has a greater error, making this the optimum value for the generating interval. (Graphing the error of each interval against the generating interval value on a single graph bears this out.) Changing the value to 116 $\frac{2}{3}$ cents will generate the 72-tone equal temperament. Values of 116.129 and 117.093 cents will generate the 31- and 41-tone equal temperaments, respectively. All five of these tonal systems (the three equal temperaments, the pure 9:5 temperament, and the Partch just intonation) have the same fingering patterns in all keys, not only within themselves, but also from one to another. In my opinion, the fingering patterns for 41 are a considerable improvement over those on the generalized keyboard, but there is not much point in using this alternative keyboard for systems below 31 tones in the octave (22 happens to be impossible).