Ramsay - The 13th Mathematical Scale an abnormality

notes each; that is, 24 new notes, which, with the seven original major notes and the one different minor note, make 32 in all; and 32 notes in the Octave are all that belong to **13 major** and **13 minor mathematical** scales.¹

The six successive major scales with sharps require 2 new notes each, and the six successive minor scales with sharps require also 2 new notes each; but one of these new notes for each minor scale is supplied from the scale of the relative major, and the other from the sub-relative major, *i.e.*, the scale one-fifth lower than the relative. So when the major scales with sharps have been developed they furnish all the new notes needed for the minors. The six successive minor scales with flats require 2 new notes each, and the six successive major scales with flats require 2 new notes each, and the six successive major scales with flats require 2 new notes each, and the six successive major scales with flats require 2 new notes each, and the six successive major scales with flats require each 2 new notes; but one of these is supplied from the scale of the relative minor, and the other from the scale of the super-relative, *i.e.*, the scale one fifth higher than the relative. So when the minor scales with flats are developed they furnish all the new notes require by these majors.

The reason why there are **13 mathematical scales** is that G? and F# are written separately as two scales, although the one is only a comma and the apotome minor higher than the other, while in the regular succession of scales the one is always 5 notes higher than the other; so this G? is an anomaly among scales, unless viewed as the first of a second cycle of keys, which it really is; and all the notes of all the scales of this second cycle are equally a comma and the apotome higher than the notes of the first cycle; and when followed out we find that a third cycle is raised just as much higher than the second as the second is higher than the first; and what is true of these majors may be simply repeated as to the D# and E? of the minors, and the new cycle so begun, and all successive minor cycles. Twelve and not thirteen is the natural number for the mathematical scales, which go on in a spiral line, as truly as for the tempered scales, which close as a circle at this point.

1 See Plate VIII. - The Double Table of Mathematical Intervals and Keys.

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