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**MATHEMATICS, PIANO PLAYING AND EAR TRAINING:
NEW FACETS FOR APPLYING “THESAURUS OF
SCALES AND MELODIC PATTERNS”**

In 1947 Russian-born American composer, pianist, conductor, and music theorist Nicolas Slonimsky published his “Thesaurus of scales and melodic patterns” (named as *Thesaurus* in this text) as theoretical and practical educational work which was supposed to become one of most influential sourcebook for composers and performers in the 20th century. *Thesaurus* includes 479,001,600 combinations of the twelve tones of the chromatic scale.

The principal mathematical idea in the *Thesaurus* consists in formation of new scales based on the division of the octave into several equal parts in ascending and descending direction. Such approaches have their antecedent authors with their models of scales. Among them one can mention C.L. Hanon [1873], or H. Schradieck [1899]. In the 20th century such antecedents were also A. Haba [1927], J. Schillinger [1946] and O. Messiaen [1944].

The main aesthetic principles of Slonimsky were: orderliness in scale variants finding and feeling of symmetry beauty. It might say that such an approach is compatible to Escher’s approach in his graphics (namely, the regular and irregular tiling in his mosaics).

For the purposes of music education *Thesaurus* can be served as:

- 1) keyboard training sheets for music players;
- 2) harmonized scale navigation for music composers;
- 3) “ear trainer” for course of modern solfege based on the 20th century music language.

The Slonimsky scales may serve for ear training to improve:

- intonation – through forming ability for transformation of already learned melodic patterns into their variants by music ear;
- harmonic ear – through training in chromatic tonality in its harmonic functions with major-third- and minor-third-root tones correlation;
- modal hearing – through learning the wide spectrum of diatonic and chromatic modes and polymodal structures;
- rhythmic sense – through practicing polyrhythmic patterns.

Nowadays ideas of *Thesaurus* are used in the jazz improvisation area [Yamaguchi 2012].

REFERENCES

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