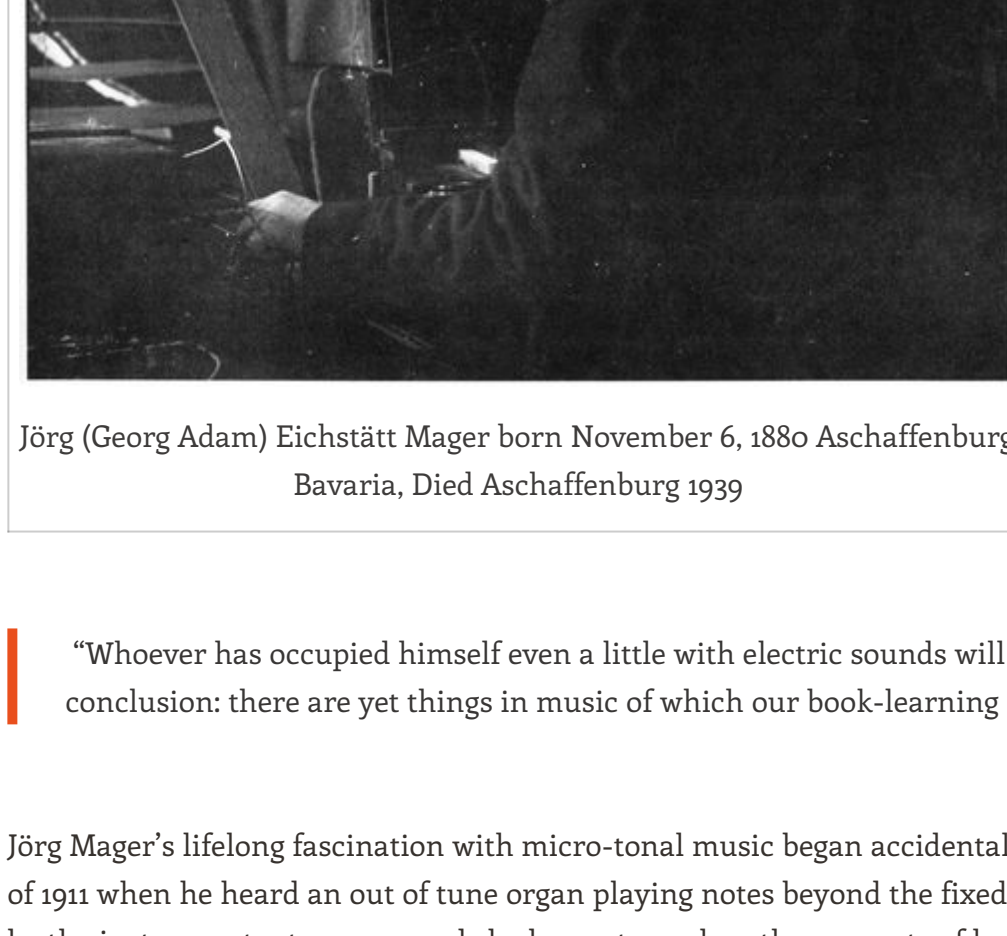


# The Electrophon (1921), Sphärophon(1924), kurbelsphärophon (1926), Klaviatursphärophon(1928), Partiturophon (1930) and Kaleidophon(1939). Jörg Mager, Germany.



Jörg (Georg Adam) Eichstätt Mager born November 6, 1880 Aschaffenburg, Bavaria, Died Aschaffenburg 1939

“Whoever has occupied himself even a little with electric sounds will be forced to the conclusion: there are yet things in music of which our book-learning cannot dream.” Jörg Mager

Jörg Mager's lifelong fascination with micro-tonal music began accidentally during the hot summer of 1911 when he heard an out of tune organ playing notes beyond the fixed tempered scale. Fascinated by the instruments strange sounds he began to explore the concepts of half and quarter tone music which he eventually self-published in his 'Vierteltonmusik' of 1915. At the same time he began to design an instrument that was capable of delivering micro-tonal and quarter tone scales, the first of which was an acoustic harmonium, the 'Vierteltonharmonium' (Four-Tone harmonium) in 1912.

After his participation in the failed 1918 communist coup in Bavaria, Mager left for Berlin. Here he joined a small circle of microtonal musicians (Mager, Alois Hába, Richard Stein, Ivan Wischnegradsky) under the wing of renowned composer and theorist Ferruci Bussoni. This circle of musicians were united in their aim to liberate music from the tyranny of fixed-tonality, however, rather than adapt existing instruments, Mager decided to create an entirely new instrument based on the emerging radio technology of the time.

To survive in post WW1 hyper-inflationary Berlin, Mager accepted any unskilled labour he could find. It was while working in a radio vacuum tube factory that he hit upon the idea of using vacuum tubes as the basis for his first electronic microtonal instrument, the Electrophon in 1921. The Electrophon was a simple monophonic instrument based on the same heterodyne principal as that of the Theremin; a method by which two frequencies are combined within the radio frequency spectrum (not perceptible by the human ear) to produce a third frequency that is equal to the difference between the latter two frequencies and that itself is within the audible spectrum humans. In case of Electrophon two 50 KHz frequency oscillators were used. The novel feature of the Electrophon was that rather than being controlled by a fixed tone manual, notes were instead triggered by rotating a metal handle, creating a glissando type effect on a continuous tone. Under the handle was a semicircular plate marked with chromatic scale intervals. Changes in tone could be applied through various filters. Further developments of the Electrophon were christened the Sphärophon after the Pythagorean legend of the music of the spheres.

“The music of the future will be attained by radio instruments! Of course, not with radio transmission, but rather direct generation of musical tones by means of cathode instruments! [ ] Indeed, the cathode-music will be far superior to previous music, in that it can generate a much finer, more highly developed, richly coloured music than all our known instruments! ”

Jörg Mager: "Eine Neue Epoch Der Music Durch radio" (Berlin 1924)

Mager's proposal in "Eine Neue Epoch" was that the medium of radio should be used to create and deliver a new type of utopian 'free' music by means of new electronic cathode-ray musical instruments, rather than just a means of transmitting mass content:

“Radio firms have mobilised more energy for transmission of a radio-music but have hardly shown any interest in the most important problem: the production of music itself.”

“the music of the future will be implemented largely by radio instruments not only in the sense that they can be easily transmitted, but especially that musical sounds can be produced directly through cathode-ray instruments. “

Mager's fellow Microtonalist Czech composer Alois Hába added:

“This is a new era in the development, not only in building instruments, but in music in general. “

Further developments of the Sphärophon lead to the kurbelsphärophon unveiled at the 1926 Donaueschingen summer music festival (alongside Leon Termen's Theremin). This adaptation added a second manual dial that allowed the player to interrupt the instrument's continuous output and avoid the continuous glissando of the Sphärophon by queuing up another note and added two pedals to control each note's volume and envelope.

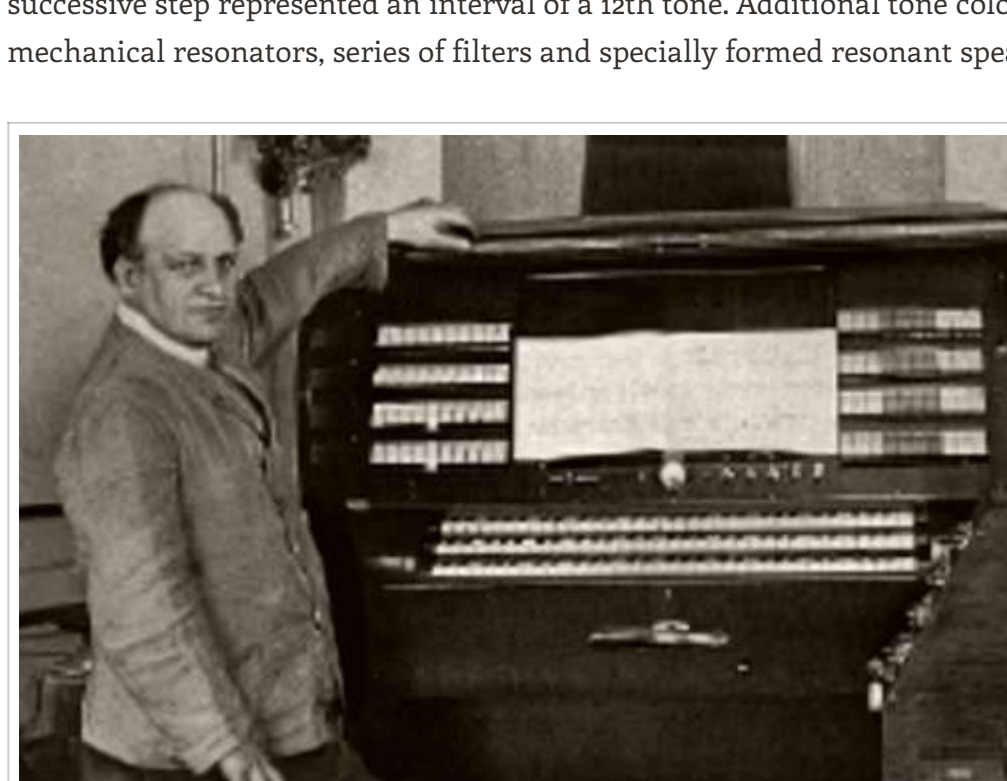


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Jörg Mager an seinem «Sphärophon»

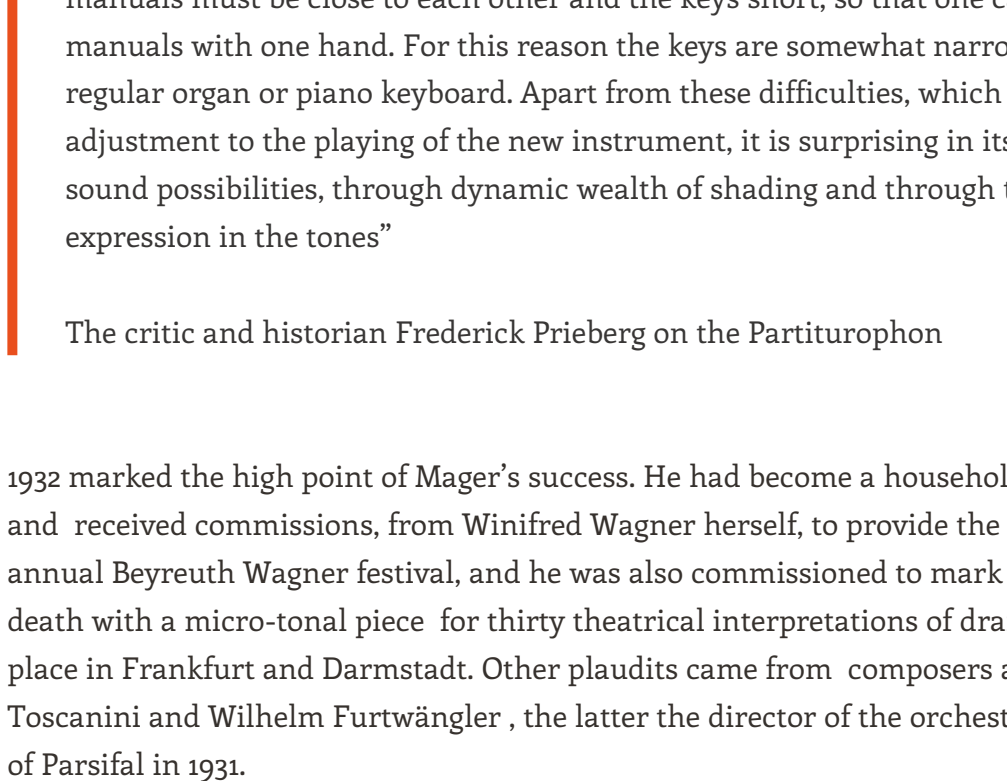
Mager playing the Kurbelsphärophon

Though mostly ignored at the time, Mager's instrument quickly gained notoriety throughout Germany; the composer Georgy Rimsky-Korsakov (Grandson of the Russian composer) composed some quarter-tone experimental pieces and Paul Hindemith enthusiastically endorsed Mager's instrument. This support lead to the formation in 1929 of the 'Studiengesellschaft für Elektro Akustische Musik' ('Society for Electro-acoustic Music) in Darmstadt to support his research (funded by the city of Darmstadt, the Heinrich Hertz Institut für Schwingungsforschung and the Reichsrundfunk radio station). The society was housed in a large, luxurious castle in Darmstadt and staffed with skilled technicians including the future electronic instrument designer **Oskar Vierling**.



The Klaviatursphärophon

With this resource at his disposal Mager continued to develop his instrument design, creating the Klaviatursphärophon in 1928. In this model he replaced the handles of the Kurbelsphärophon with two short keyed monophonic keyboards – the shorter keys allowing the player to play both keyboards simultaneously thereby producing a duophonic tone. It was also possible by adjusting the capacitance of the sound generating circuit to alter the intervals between each key and scale the acoustic length of the keyboard. An octave could be made as small as a major second, so that each successive step represented an interval of a 12th tone. Additional tone colour was added by mechanical resonators, series of filters and specially formed resonant speakers.



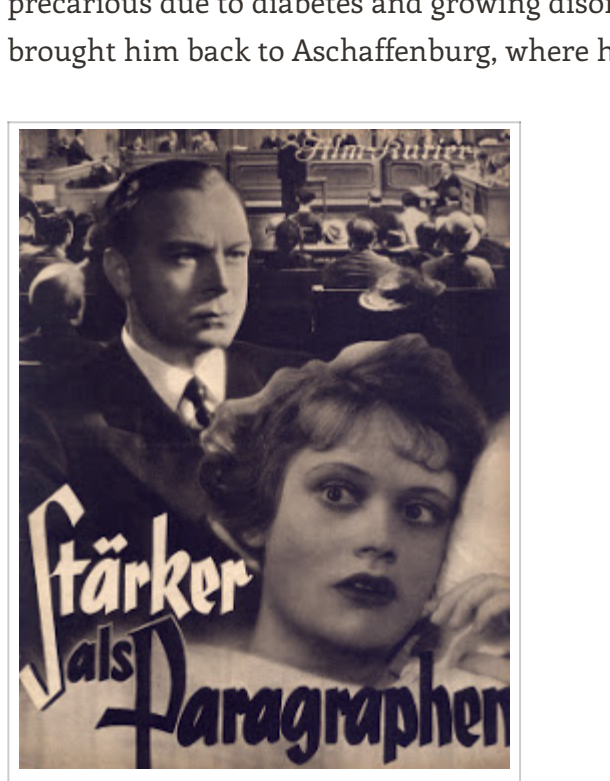
Jorg Mager and the The Partiturophon

By now, Mager's focus was moving from micro-tonality towards audio timbre. The "Partiturophon" (from the German 'Partitur' or musical score, reflecting his aim of capturing the varied combinations of orchestral timbre) was a four (in later models, five) keyboard and five voice version of the Klaviatursphärophon produced in 1930. This instrument allowed the player to play four (or five) voices at once, one voice per keyboard:

“Mager produced today and organ with many registers on which four voice playing is possible. So far there is only one difficulty; that is, that each voice must have its own keyboard, thus the four voice movement must be played on three manuals and the pedal. For this reason the manuals must be close to each other and the keys short, so that one can easily play on several manuals with one hand. For this reason the keys are somewhat narrower than those on a regular organ or piano keyboard. Apart from these difficulties, which require a special adjustment to the playing of the new instrument, it is surprising in its infinite multiplicity of sound possibilities, through dynamic wealth of shading and through the possibilities of expression in the tones”

The critic and historian Frederick Prieberg on the Partiturophon

1932 marked the high point of Mager's success. He had become a household name in Germany and received commissions, from Winifred Wagner herself, to provide the sound effects for the annual Bayreuth Wagner festival, and he was also commissioned to mark the centenary of Gothe's death with a micro-tonal piece for thirty theatrical interpretations of drama Faust, which took place in Frankfurt and Darmstadt. Other plaudits came from composers and conductors Arturo Toscanini and Wilhelm Furtwängler, the latter the director of the orchestral interpretation of Parsifal in 1931.



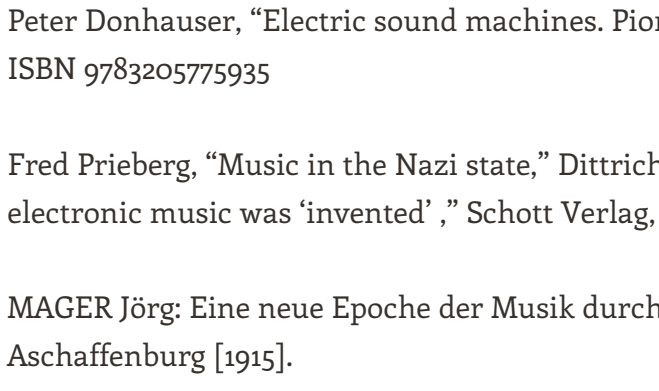
The Kaleidophon

Yet this success was short lived. A new electronic instrument had emerged in 1930; Dr Friedrich Trautwien's 'Trautonium'. In contrast to Mager's amateur enthusiasm, Trautwien was a trained engineer and managed to produce an instrument that was both novel, reliable and wasn't shackled by the complexity of Mager's devotion to micro-tonality. The final blow to Mager came in 1933 when Hitler's National Socialists took power. Experimental music was labelled 'Entartete' or 'degenerate' and un-German; the great flowering of German musical innovation had come to an abrupt end. Mager tried to ingratiate himself to the new party "to get on the gravy train" but became increasingly paranoid and irritable, driving away many of his collaborators and supporters. In the struggle to develop the Partiturophon as a commercial domestic instrument, the contract for the 'Studiengesellschaft für Elektro Akustische Musik' lapsed and funding dried up. Mager spent the rest of his life leading an impoverished semi-nomadic existence. His state of health was increasingly precarious due to diabetes and growing disorientation and mental confusion. His daughter Sofie, brought him back to Aschaffenburg, where he died on April 5, 1939, at the age of 59.



spite the oppressive new political climate, Mager was commissioned to create sound effects with the Partiturophon in the 1936 film "Stärker Paragraphen als" by Jürgen von Alten, with music by Rudolf Perak.

None of Mager's instruments are known to have survived the Second World War, The castle at Darmstadt was heavily bombed by the Allies, obliterating the last traces of the Partiturophon and it's predecessors. The last of Mager's family of instruments was the Kaleidophon completed in 1939 and only survives in notes as "a monophonic electronic instrument with kaleidoscopic sound mixtures following the tonal precepts of Arnold Schoenberg and Ferruccio Busoni."



Mager's colleague Alois Hába playing the Partiturophn

Mager's instruments ultimately failed because of, on one hand, Mager's single minded devotion to microtonality which had virtually no repertoire and was little accepted even by the avant garde of the time (even Mager's close circle of friends Hába, Wischnegradsky and Stein never realised their promises to compose for the instruments) and on the other, the fact that the instruments were in continual development, unstable and never completely finished making it difficult to become anything more than an interesting curiosity.

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