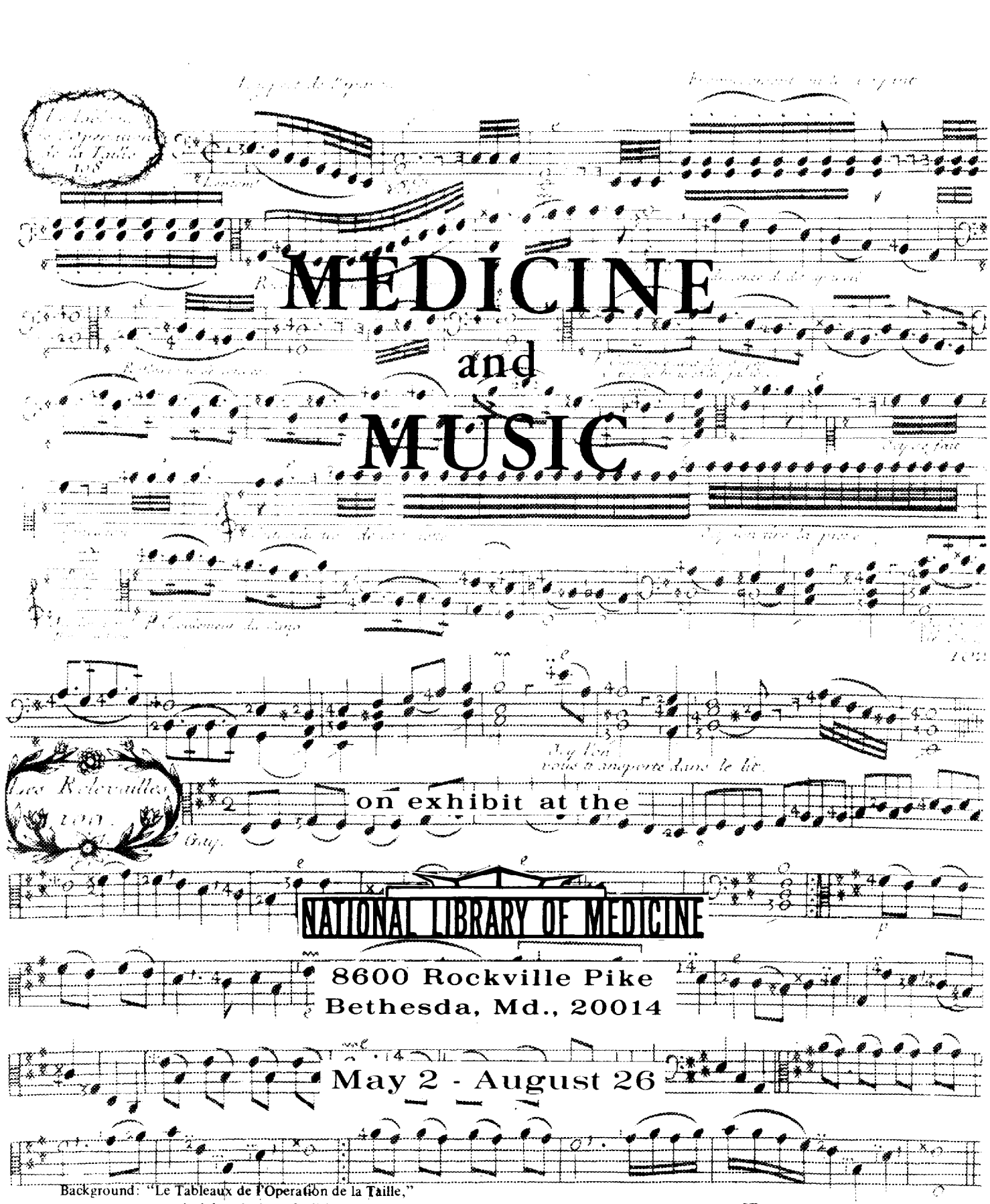


MEDICINE and MUSIC

on exhibit at the

NATIONAL LIBRARY OF MEDICINE

8600 Rockville Pike
Bethesda, Md., 20014

May 2 - August 26

Background: "Le Tableaux de l'Operation de la Taille,"
a musical description of a lithotomy,
from the *Cinquieme livre de pieces de viole*,
by Marin Marais, 1725.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE • Public Health Service • National Institutes of Health

MEDICINE
and
MUSIC

The poets did well to conjoin music and medicine in Apollo, because the office of medicine is but to tune this curious harp of man's body, and to reduce it to harmony.

Francis Bacon

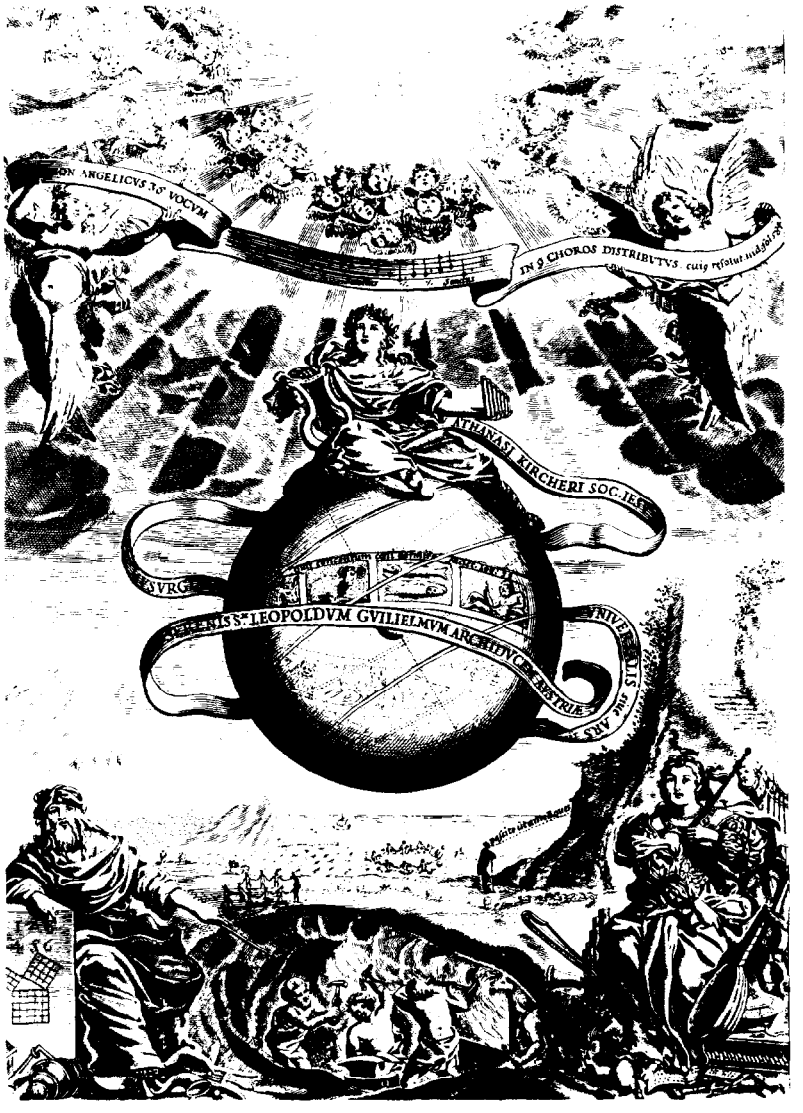
From Athanasius Kircher, *Musurgia universalis*, 1650.

Throughout the long history of healing, the tuner of the harp and the healer of the body have often been united in the same person. In many primitive cultures music is an integral part of the healing ritual, words and music combining to drive out evil spirits or summon beneficent ones. In some North American Indian tribes the songs were said to be the gift of an animal or spirit, received by the medicine man in a vision or dream.

The ancient Greeks found this relationship in Apollo, god of healing and of music, father of Aesculapius and the muses. They believed in the powerful influence of music over emotions and actions, each mode, rhythm, and instrument having a particular effect. The Phrygian mode called forth courage and ferocity, the Dorian induced noble and uplifting feelings and was recommended for the education of the young. The harmony of the body and soul was reflected in the harmony of music - the right relationship of mode, rhythm, and words. In the healing rituals of the Pythagorians and in the temples of Aesculapius, music was used to restore health when mental or physical harmony was disturbed. For gout, snake bite, and epilepsy in particular, several classical authors mention the therapeutic use of music.

The 6th century philosopher, Boethius, divided music into three types: "musica mundana," or the relations of the cosmic bodies; "musica humana," the workings of the human body and soul; and "musica instrumentalis," or composed music, both instrumental and vocal. Renaissance theorists, with their propensity for synthesizing and drawing diverse areas of experience into a single system of thought, were much attracted to this concept.

Gioseffo Zarlino, the 16th century composer, theorist, and "maestro di capella" of San Marco, Venice, developed this tripartite division in his *Institutioni Harmoniche*: just as the world was created of four elements and the body of four humors, so music was composed of four modes. Each mode was related to one of the elements and to one of the humors and its associated temperament - the Phrygian mode to fire and yellow bile, the Dorian to water and phlegm. Health, which consisted of a harmonious relationship among the four humors, could be restored by music in the proper mode, stimulating the sluggish humor or dispersing the over-abundant one.

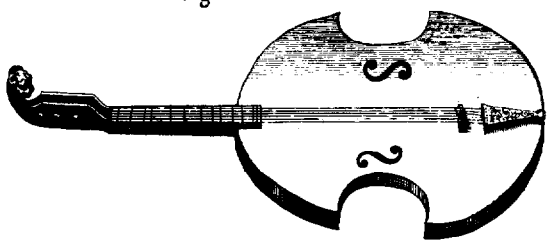


"Musica mundana" and "musica instrumentalis." Title page of A. Kircher, *Musurgia universalis*, 1650.

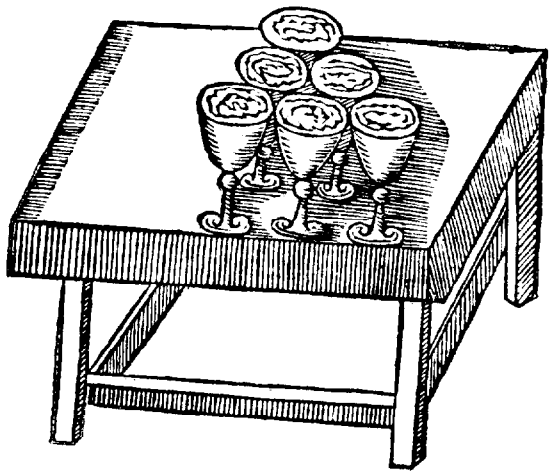
Athanasius Kircher, the 17th century German physician and scientist, who wrote on all aspects of music including its effects on the body, combined the earlier humoral theory with an interest in the solid parts of the body. This approach was to characterize iatromusical speculation for the next two centuries. The effect of music on the humors he "demonstrated" by means of glasses, each filled with a different liquid having supposedly the character of one of the humors. When a moistened finger was rubbed around the rims of the glasses, producing a musical tone, each fluid was set in a different degree of motion. Likewise each humor was moved by a particular tone.

The music moved the bodily fluids by means of reverberations of the outer air, which, in turn, moved the inner air or "animal spirits" present in the ear. These spirits carried the reverberations in the blood stream throughout the body. The consonance and dissonance, tempo, pitch, melodic intervals, and dynamics of the music each had its particular effect on the motions of the animal spirits and each variation of motion created a particular emotional state. The muscles and nerves were moved by the animal spirits, but they were also affected directly by music. Stretched like strings along a wooden sound board, the fibers vibrated in sympathy when a tone "proportional" to them was sounded.

The condition of the fibers - the muscles, nerves, arteries - was the principal theme of 18th century writers on music and medicine. E. A. Nicolai, medical professor at Halle, described the fibers as either dissonant or consonant. Music could alter the condition of the solid matter, he argued, but it worked most strongly directly on the emotions, which could themselves alter the physical organs. J. W. Albrecht, professor of



From Robert Fludd, *Utriusque cosmi . . . historia*, 1617.



From A. Kircher, *Phonurgia nova*, 1673.

anatomy at Gottingen, wrote that the fibers, when they were too loose or tight, could be "retuned" by music.

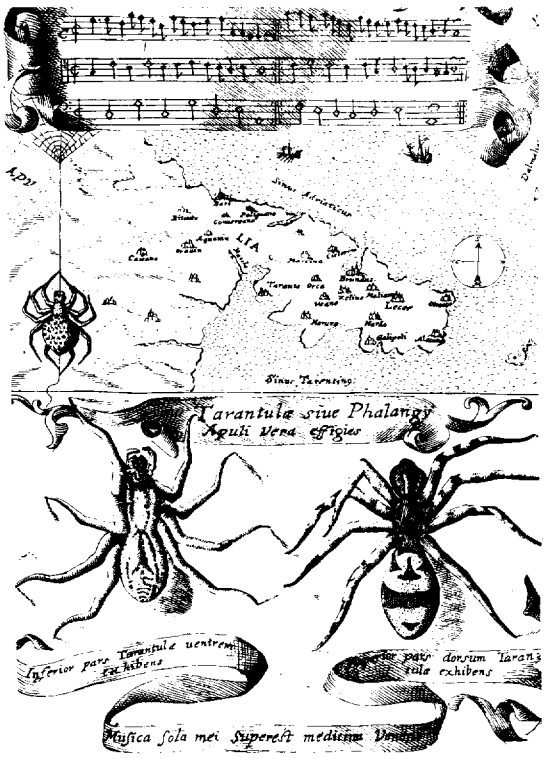
Franz Anton Mesmer, in his theory of animal magnetism, late in the 18th century, revived the Renaissance idea of health as a state of harmony between cosmic and personal forces. A skilled musician and friend and patron of Mozart, Mesmer believed music to be a potent medium for the conveyance of the magnetic "fluid." He often carried out his treatment to the accompaniment of music played on the piano or glass harmonica, an instrument made of rotating glass cylinders which produced tones when rubbed by wet fingers. The patients receiving magnetic treatment were reported to be highly sensitive to the music; a change of key or meter could cause spasms.

The history of tarantism provides one of the most fascinating illustrations of the use of music for healing. This phenomenon, recognized since the late middle ages, became a subject of scientific interest in the 17th century and was observed and described by Giorgio Baglivi, Epifanio Ferdinandi, and Kircher. The disease was found mainly in Apulia, though it had been observed in other parts of southern Italy and in Spain. It struck only in summer. The victims, almost all women, fell into a stupor from which only music could rouse them. Though the bite of the tarantula was blamed, often no bite mark could be seen and several experimenters ascertained that this spider had no such dire effects in the other parts of Italy where it was found.

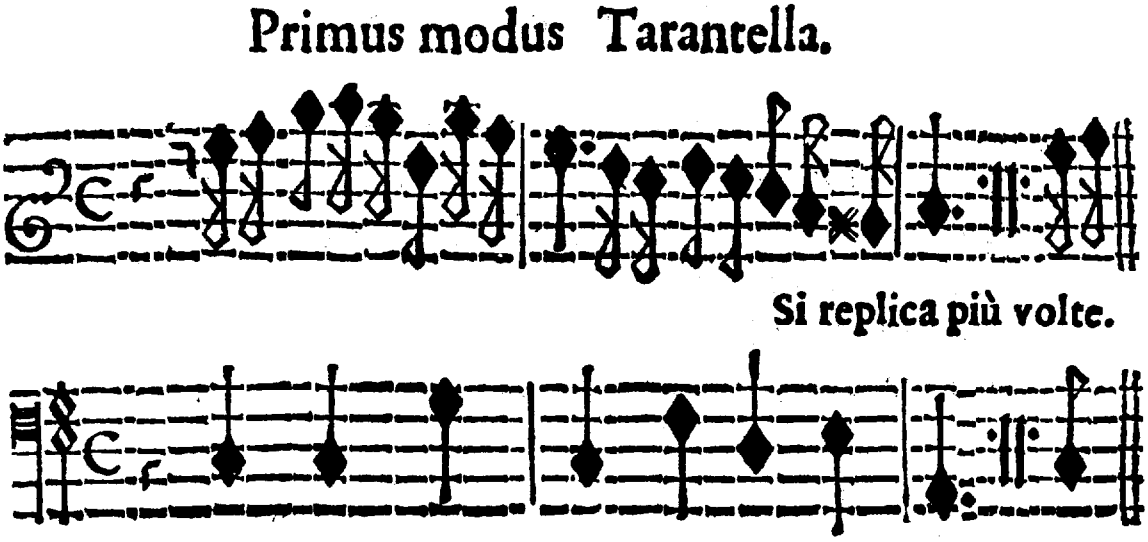
Musicians wandered in the summer from village to village, playing for the "tarantati." Each patient was affected by only a particular song and the musician might try several on different instruments; lute, guitar, violin, flute, and percussion were all used. Kircher preserved several examples of tarantellas. There seems to have been no invariable meter or key; some were sung, others purely instrumental. Their common characteristic was speed and repetition. Short phrases were played over and over with ever increasing tempo as the stricken ones, roused from their stupor, whirled and jumped in a frenzied dance. The dancers made erotic gestures, waved swords in the air, or tore branches from trees. Bright colors attracted them and they were repelled by black. The sound and sight of water pleased them. The dancing continued for several days, after which the patients appeared to be healed. But for several years, whenever they heard the brisk strains of the tarantella, they again felt compelled to dance.

There were many attempts to explain tarantism and its strange cure. Ferdinandi believed that the dancers, thrown into a sweat, expelled venom through their pores, though ordinary sudorifics were useless. Baglivi believed that the blood, coagulated by the poison, was set in motion by the music. Others suggested that the disease was a form of melancholia, and Baglivi wrote that its symptoms were sometimes feigned by women suffering from emotional disturbances.

Mesmer's clinic, with violinists playing in the alcove. Engraving.



From A. Kircher, *Magnes; sive, De arte magnetica*, 1641.



From A. Kircher, *Magnes; sive, De arte magnetica*, 1641.

Modern accounts of tarantism explain it as a cultural and psychological phenomenon. In this area of Greek influence, the mystery cults, in particular the worship of Dionysis, were never completely eradicated by the Church. Certain forms of the rituals continued and proved especially suggestive to the emotionally disturbed. With the original meaning completely forgotten, the ancient rituals were given a physiological explanation and so became a part of medical history.

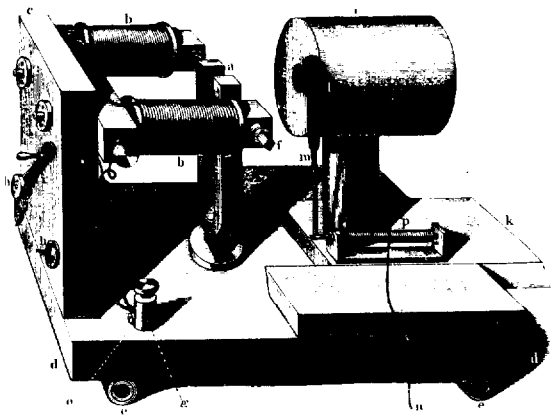
Though 17th and 18th century writers recommended music for a variety of physical ailments including gout, dislocations, and fevers, it was particularly called for in the treatment of mental illness. Common experience showed the powerful effect music had on the emotions; military music, lullabies, love songs - all aroused feelings and actions. Classical and Biblical literature confirmed this. David calmed King Saul with his music. Alexander the Great was led through the gamut of human emotions by the playing of his minstrel, Timotheus. In the 18th century the singing of Farinelli, the famous castrato, was said to have roused King Philip V of Spain from a severely depressed state. A nightly repetition of the same songs kept him from relapse until his death 10 years later. Robert Burton in *The Anatomy of Melancholy* spoke highly of the power of music to raise the spirits, but warned that love songs could bring on a lover's melancholy.

The early 19th century saw the introduction of increasingly humane treatment of the mentally ill. At the same time, experiments were made with music in mental hospitals. A witness to a violin recital held in the courtyard of an English hospital in 1823 reported that most of the patients were

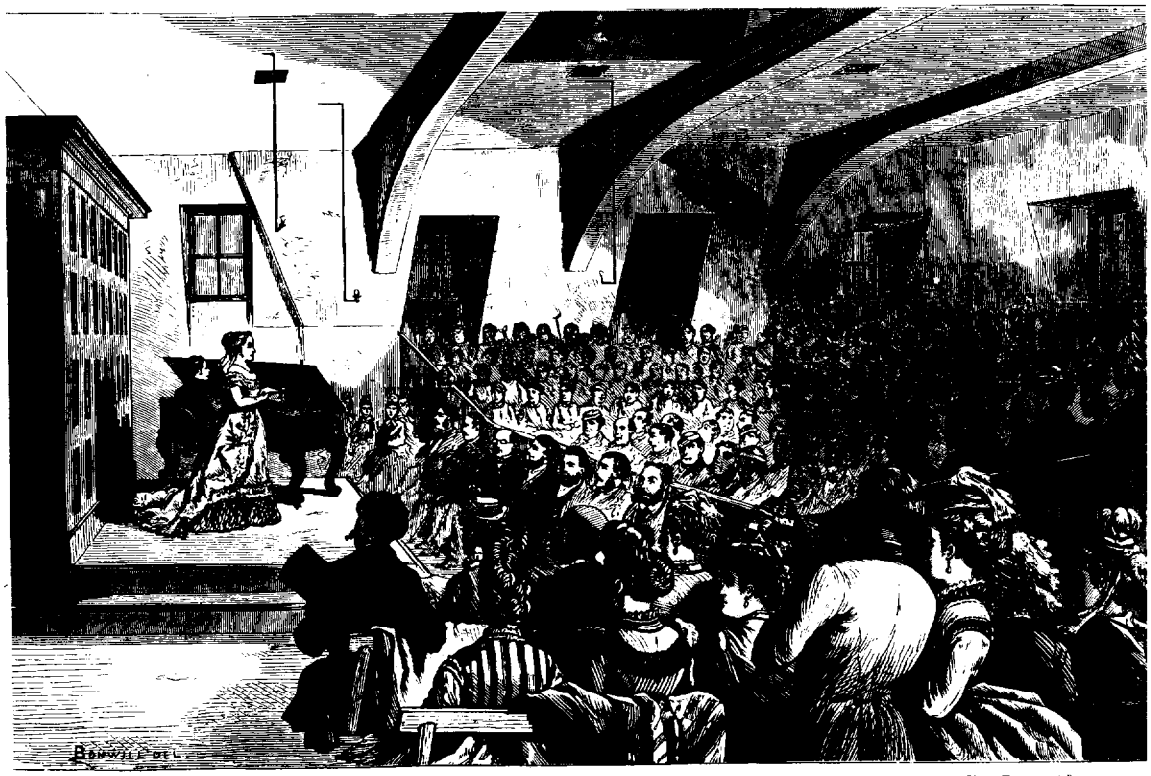
From A. Kircher, *Phonurgia nova*, 1673.

"more lively and more cheerful than usual - very much more so." François Leuret, a surgeon at the Bicêtre in Paris, argued that the benefits of music would be far greater if, instead of weekly concerts, daily music lessons were provided for the patients, a suggestion that has found support in the modern applications of music therapy. The concentration required for music making, Leuret argued, created a distraction from the madness.

Scientific investigations in the 19th century provided the first accurate measurements of the physical effects of music. Hermann von Helmholtz, the great German scientist, in his important work on the physics and physiology of musical sound, *Die Lehre von den Tonempfindungen* first published in 1863, described the components of a musical tone and the physical basis of our perception of consonance and dissonance. Later experimenters found that pulse, blood pressure, and breathing were measurably affected by the various musical elements, rhythm, dissonance and consonance, pitch, and loudness.



Apparatus used by Helmholtz to produce combinations of overtones. From Hermann von Helmholtz, *Die Lehre von den Tonempfindungen*, 1863.



CONCERT FOR THE INMATES OF THE CHARITY HOSPITAL, BLACKWELL'S ISLAND.—Drawn by C. E. H. Bonwill.—[See Page 150.]

Wood engraving from *Harper's Weekly*, 1874.

Though the claims of its modern practitioners are far more modest than those of past centuries, music therapy has won an accepted place in the treatment of mental illness and music programs have been established in many mental hospitals. Even the most profoundly disturbed patients who seem completely unaware of their surroundings respond to the rhythmical element of music. Patients otherwise unable to relate to each other are brought out of their isolation through group musical activities. Music has been employed as an adjunct to hydro – and electroshock therapy, to sooth and then stimulate the patients. In psychotherapy music is sometimes used to arouse emotions and, by free association, help the patient recall the contents of the subconscious mind. For all these purposes the music is carefully chosen for the melodic, harmonic, and rhythmic elements that will produce the desired effects.

In general as well as mental hospitals, and in institutions for the mentally retarded, music is used as a form of occupational therapy, providing an interest, an outlet for energy, and a feeling of accomplishment for long-term patients. Physiotherapists have recognized the increased muscle strength and improved dexterity that result from playing an instrument, and sometimes recommend lessons on a particular instrument as a form of exercise. Music allays anxiety, distracts from pain, and soothes restlessness. Music is the companion of delight and, though the therapeutic value of joy is immeasurable, it is always a rare and welcome visitor to the sickroom.

Credits

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