

Teisco. The name of a range of synthesizers manufactured by KAWAI from the late 1970s.

Teixeira, Manuel Machado. Portuguese organ builder, father of ANTÔNIO MACHADO E CERVEIRA.

Teke. Struck vessel idiophone of the Dhola people of Mbale district, Uganda. It comprises an inverted bowl.

Teke bora. Wooden concussion sticks of the Bariba people of Benin. It is used by men as rhythmic accompaniment to *teke* music, together with hourglass and cylindrical drums, for the enthronement of kings.

Tekerő. HURDY-GURDY of Hungary. Semi-professional peasant musicians play mainly traditional dance music on it, either as a solo instrument or, more often, with a melodic instrument (usually the clarinet). If its melody string is tuned to $f\sharp$, the tuning of the two accompanying strings, which provide a drone accompaniment, is *B* and *b*.

Te-keya. Rattle of Gbaya women of the Central African Republic. It is made from two spherical fruit shells filled with small pebbles and joined by a cord. The singer uses a pair in each hand and by a regular movement brings the shells together. The instrument is used to accompany singing, often of sad songs. See S. Arom and G. Dournon-Taurelle: 'Afrique: complaintes et incantations', HMU 946 [disc notes].

Tekpede. Ground harp of the Dan people of the Ivory Coast (for illustration see GROUND HARP). See H. Zemp: *Musique Dan* (Paris, 1971), 52.

Tēku. A general term for drum in Okinawa, Japan, corresponding to the Japanese TAIKO. It generally designates two shallow-bodied barrel drums used in tandem: the *ufudēku*, a drum with tacked heads (see HIRADAIKO), placed vertically at the player's left; and the *kudēku*, a drum with lapped heads of the *nōdaiko* kind (see SHIMEDAIKO), placed in front of the player. This set accompanies both classical song and folksong. The term may sometimes also designate the CHUJIN drum, both in its Okinawan and Amami uses.

DAVID W. HUGHES

Telempong. GONG-CHIME used in the *makyung* theatre ensemble in the Serdang area on the east coast of North Sumatra. The *telempong* is also used in the *biola mendu* ensemble for theatre performances in Riau (Indonesia) and West Malaysia. The gongs are about 17 cm in diameter, with a boss about 4 cm wide. They are made of bronze, mostly in southern Thailand, and are beaten with lightly padded sticks. See also TALEMPONG.

MARGARET J. KARTOMI

Teleng [keding]. Idiochord TUBE ZITHER of the island of Alor, Indonesia. Its eight strings, about 50 mm wide, are prised out of the surface of an old stout tube of bamboo about 1 metre long. They are each raised on bridges at both ends. The two outer strings (*kingkong*) are the highest pitched and the two innermost strings (*gong ele*) the lowest.

MARGARET J. KARTOMI

Télé-sculpture musicale. See ELECTROMAGNETIC MUSICAL.

Telford, William (d Dublin, 1885). Irish organ builder. He established himself in Dublin in 1830, the firm later becoming known as Telford & Telford. It built a number of organs in the mid-19th century, ranging in size from the 47-stop instrument for St Peter's College, Radley (c1850), to small church barrel organs. Other important organs included those for Trinity College, Dublin (1838), and the church of St Malachy, Belfast (1849). While the bulk of his work was in Ireland, Telford was known and respected in England, where he was one of the adjudicators of musical instruments at the Great Exhibition of 1851 held at the Crystal Palace.

BIBLIOGRAPHY

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Telharmonium [Dynamophone]. An electromechanical keyboard instrument developed in Washington, DC, Holyoke, Massachusetts, and New York between 1892 and 1914 by Thaddeus Cahill (b Mount Zion, Iowa, 1867; d New York City, 12 April 1934). 'Dynamophone' eventually became Cahill's preferred name for his instrument, but it was not widely adopted. Three instruments were completed, none of which fully embodied the construction specifications contained in Cahill's five American patents. Cahill was also granted 30 patents for other inventions, including piano actions, electric typewriters and typesetting equipment.

After experimenting for three years, Cahill applied for a patent in 1895 and began to construct the first complete model of the Telharmonium, a small prototype for the later versions. The sound-generating system of the instrument was based on the tone-wheel principle: the basic component was a rheotome – a rotor with alternate conducting and insulating sections – in contact with stationary metal brushes. The rheotomes were grouped as rheotome cylinders, single rotors on which six simple rheotomes were machined, corresponding to the fundamental and first five overtones. The plans show 12 shafts (one for each note of the octave) on each of which seven cylinders (one for each octave) were to be mounted; the shafts were rotated by belts mounted on a single driveshaft, powered by a constant-speed, direct-current electric motor. A large dynamo supplied current directly into the mainframe; the current travelled through the pitch shafts into the conducting sections of the revolving rheotomes, so that the brushes received interrupted electrical signals. The waveforms thus produced were filtered into sine waves by means of four sets of transformers and then combined into a composite signal, which was transmitted to multiple telephone receivers and to 'loudspeakers' made of piano soundboards. The instrument was played from a keyboard, and a hammer mechanism, dependent on key velocity, controlled volume by moving a transformer coil.

Cahill completed work on the first version in 1900 and used it to test designs for a larger model. In 1903 it was moved to Holyoke, where Cahill set up a laboratory. In the final form of the first Telharmonium (completed in 1906) the rheotome cylinders were removed and replaced by 35 alternators; those pitched above the lowest octave were used simultaneously to create the fundamental of one note and one of the overtones of