



**PERCY GRAINGER'S  
PARADOXICAL QUEST FOR 'WORLD MUSIC':  
FREE MUSIC AND FREE MUSIC MACHINES**

**CURATED BY ELINOR WROBEL**

**GRAINGER MUSEUM  
THE UNIVERSITY OF MELBOURNE, PARKVILLE  
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“Grainger has a world wide reputation, rather like that of Sousa or of Johann Strauss: each is a genial composer of pleasant music in a specialized vein. To have such a reputation is, undeniably, no sad fate, but in Grainger’s case it is so partial a recognition of artistic accomplishment that one is forced to reflect on the obscurity created by the wrong kind of fame. Grainger has suffered in many respects through his own phenomenal success both as pianist and composer.

. . . How great Grainger’s contribution in this field [free-music] will eventually be, remains to be seen; but we have in the first practical demonstrations of ‘free music’ a challenging accomplishment by one of the great musicians of our time.”

Source: Richard Franko Goldman, *The Juilliard Review* II (Fall 1955) No. 3, pp.37-47.

Catalogue compiled and written by Elinor Wrobel, Exhibition Curator.

Research by Elinor Wrobel and Rosemary Florrimell, Curator, Grainger Museum.

Free Music drawings: size in cm. height preceding width.

Accession number refers to Grainger Collection, Grainger Museum, The University of Melbourne.

NB. Idiosyncracies of spelling and punctuation in quotations reflect Grainger’s own usage.

“Legends” refer to written information about museum artefacts which have been supplied by Percy Grainger.

## GEORGE PERCY GRAINGER (1882-1961)

### CHRONOLOGY

1880	FRIDAY 1ST OCTOBER	Rosa [Rose] Annie Aldridge married John Harry Grainger at St. Matthew's Church, Kensington Road, Adelaide, South Australia.
1882	SATURDAY 8TH JULY	Birth of George Percy Grainger at Brighton, Victoria.
	THURSDAY 28TH SEPTEMBER	George Percy Grainger christened at St. Andrew's Church of England, Brighton, Victoria. Registration no. 1667, by Rev. Samuel Taylor.
C.1886		Starts formal education at home.
1888		Opening of Princes Bridge, Melbourne, designed by John H. Grainger.
1888		Starts taking daily piano lessons with his mother, Rose.
1890		John H. Grainger lives apart from his family.
C.1891		Starts to study acting and painting with Thomas A. Sisley, and drawing with Frederick McCubbin.
1892		Piano lessons with Louis Pabst in Melbourne.
1894	MONDAY 9TH JULY	First public performance as a pianist, at a Risvegliato concert in the Masonic Hall, Melbourne.
1894	DECEMBER	Pabst leaves Australia for Europe and encourages Grainger to continue his music study abroad. Grainger begins study with a former Pabst pupil, Adelaide Burkitt.
1895	SATURDAY 26TH MAY	Leaves Australia with his mother, Rose, to study piano and composition at the Hoch Conservatorium, Frankfurt am Main, Germany.
1900	6TH DECEMBER	Solo recital, Frankfurt, marks the end of his student days.
1901	MID MAY	Moves to London, with his mother, where his career as a virtuoso pianist is launched on 11th June.
1903-04		Tours Australasia with Ada Crossley and her concert party.
1904	29TH SEPTEMBER - 19TH OCTOBER	First concert tour in Denmark, with Herman Sandby. First meeting with Karen Holten.
1908	MAY	Makes his first recordings with the Gramophone Company.
1908-09		Tours Australasia for the second time with Ada Crossley and her concert party.

1910		First concert tours in Holland and Norway.
1911	OCTOBER	Adopts the name of Percy Aldridge Grainger, concurrently with the publication of his music by Schott & Co., London.
1912-13		H. Balfour Gardiner choral and orchestral concerts mark the beginning of Grainger's public career as a composer.
1912	15TH - 29TH AUGUST	Last holiday with Karen Holten, at Slettestrand, Jutland, Denmark.
1913	14TH NOVEMBER	Last meeting with Karen Holten before World War I, at Copenhagen Railway Station.
1914	2ND SEPTEMBER	Leaves England with his mother for the United States of America.
1917	13TH APRIL	Death of Grainger's father, John Harry Grainger, in Melbourne, Australia.
1917	12TH JUNE	Enlists in the U.S. Army as a bandsman.
1918	3RD JUNE	Becomes a naturalised American citizen.
1919	7TH JANUARY	Honourably discharged from U.S. Army.
1919		Publication of <i>Country Gardens</i> , his most well - known piano piece.
1922	30TH APRIL	Death by suicide of Rose Grainger, at 27 West 42nd Street, New York, U.S.A.
1924		Makes a private visit to the Pacific Islands and Australasia.
1926	NOVEMBER	Makes his first solo tour of Australia. First meeting with Ella Viola Ström, Swedish-born poet and painter, when he boards R.M.M.S. "Aorangi" in New Zealand en route to the U.S.A.
1928	1ST MAY	Gives wedding gift to Ella Viola Ström - manuscript score "To a Nordic Princess".
1928	4TH AUGUST	Secret marriage to Ella Viola Ström.
1928	9TH AUGUST	Marries Ella on the stage of the Hollywood Bowl at the conclusion of his concert, the last item of the programme being "To a Nordic Princess". Honeymoon at the Glacier National Park.
1934-35		Tours Australasia and establishes the Music Museum and Grainger Museum in the grounds of the University of Melbourne.
1938		Visits Australia. The Museum is officially opened.
1950'S		Works with Burnett Cross on "Free Music" experiments.
1953	3RD OCTOBER	Death of Karen Kellermann (née Holten).

1955-56		Visits Australia with Ella for nine months. Last visit to Australia.
1960	29TH APRIL	Gives his last public concert performance.
1961	20TH FEBRUARY	Dies at White Plains, New York, U.S.A.
1961	2ND MARCH	Burial in West Terrace Cemetery, Adelaide, South Australia.
1979	17TH JULY	Ella Grainger dies at White Plains, New York, U.S.A.

## **GRAINGER FREE MUSIC MACHINE**

### **Burnett Cross**

What Percy Grainger required of a machine to play his Free Music can be simply stated. Realizing these requirements were not so simple, of course, but their definiteness and straight-forwardness were a great asset

a great asset: we did not spend time developing features that would be of secondary importance to a composer. Grainger wanted a composer's machine, not one for the concert hall. As he said, he wanted to hear in actuality the sounds he had heard in his mind for many years, to determine whether they had the effect he imagined, and to adjust them accordingly.

The free music machine had to be able to play *any* pitch within its range. It was to be free of the limitations of speaking in half tones, or quarter tones or eighth tones for that matter. Any pitch (or group of pitches within the range of the seven voices planned for the machine shown) was to be available to the composer.

The machine had to be able to go from pitch to pitch by way of a controlled guide as well as by a leap. It was to be free of the limitations of the usual methods of progressing from pitch to pitch.

The machine had to be able to perform complex irregular rhythms accurately, rhythms much too difficult for human beings to execute. It was to be free of the limitations of the human performer, of what Grainger called 'the tyranny of the performer.' Of course dynamics were to be precisely controlled as well.

The machine had to be workable by the composer. It was not to require a staff of resident engineers to translate the composer's language into the machine's language or to keep the machine in working order.

This last requirement produced, I think, the most striking feature of the machine developed. Grainger had worked out a form of graph notation for Free Music for many years before. The Free Music machine developed 'reads' this graph notation, with very little modification required. The pitch control graph and the volume control graph are painted in the appropriate bands on the five-foot wide roll of clear plastic (see Figure 1). Black plastic ink is used. By sliding the portion just painted across the pitch and volume control slits, the musical result is heard at once, and any adjustments can be made at once. In fact if one paints on the plastic directly over the pitch control slit, one can hear the pitch being formed. Happily the plastic ink is used in water-soluble, so erasure is easy.

As the pitch-control graph moves across the pitch control slit, it causes the amount of light entering the slit to vary. This light (from the spotlight above) is reflected from a curved mirror to the pitch control photocell (see Figure 2). The photocell controls the frequency produced by a transistor

oscillator: more light raises the frequency, less light lowers it, and no light at all produces the bottom note of the oscillator range. Thus variations in pitch are obtained.

The output of the oscillator is sent to a common type of flashlight bulb, one that has a tiny filament and a built-in lens. The bulb changes the pulsating current from the oscillator into a pulsating beam of light. This beam is directed upward through the volume control slit, to strike the volume control photocell. The volume control graph varies the amount of light reaching this photocell, which is connected to a pre-amplifier-amplifier-speaker circuit. Thus the strength of the oscillator output can be varied and control of dynamics achieved.

Imposing on the pitch control slit a musical scale of whatever sort is desired can be done with the filter and tuning sticks. How these are mounted above the slits, on the tuning bridge, is shown in Figure 3. The tuning bridge rests on the metal guide-rails that steer the flow of the plastic sheet from roller to roller. A close-up of a filter and tuning sticks is shown in Figure 4. By sliding pieces of exposed photographic film of different densities into the filter holder, the amount of light reaching the pitch control slit can be crudely controlled and the range placement of the oscillator roughly established, for that particular voice. Then by moving tuning sticks in or out the effective width of the slit can be varied. Thus half-tone reference points (for example) of the scale can be distributed evenly along the length of the pitch control slit. The narrower the tuning sticks, or in other words the more of them there are along the slit, the finer the adjustment can be. Thanks to transistors in the oscillator and other circuits, the scale imposed is stable enough. Trying to achieve stability with a vacuum tube circuit was a maddening and unsuccessful task. The vacuum tube model turned out to be a very sensitive device for detecting changes in the characteristics of vacuum tubes by means of changes in a musical scale.

Since the spotlights are running on AC it might be expected that an AC hum would be the principal musical output of the arrangement but it turns out that this is not so. Apparently the filament of the spotlight is too massive to transmit 60 cycles per second. The power supply for the flashlight bulb, however, has to be pretty smooth D.C.

The mirror is made of a strip of copper bent by hand to the desired shape (which was easier than working out the geometry of the thing) and then chrome plated. A sharp focus on the pitch control photocell is not necessary. Both photo-cells were shielded with lightproof black cardboard from stray light. The transistor oscillator circuit produces a reedy and not unpleasant quality: a wide range of tone colours could be produced by manipulating the electronics of the oscillator, but Grainger was not at all interested in this at this stage. Command of pitch, duration and intensity were what he wanted, and quality was unimportant.

The feeder and eater rollers, as Grainger called them, are mounted on skate wheels, which allow a roller to move from side to side to compensate for irregularities in the plastic sheeting. Since the plastic sheet is constrained by the guide rails so that its position relative to the slits will not change, it must be allowed freedom at both ends of its path. An electric motor can be arranged to turn the eater roller by means of a belt, but turning the roller by hand is easy and safe.

#### LETTER, PERCY GRAINGER TO MUSIC CRITIC OLIN DOWNES 10 September 1942

'In this music [Free Music], melody is as free to roam thru tonal space as a painter is free to draw & paint free lines, free curves, create free shapes. (Current music is like trying to do a picture of a landscape, a portrait of a person, in small squares - like a mosaic - or in pre-ordained shapes: straight lines, or steps.) In FREE MUSIC the various tone-strands (melodic lines) may each have

their own rhythmic pulse (or not), if they like; but one tonestrand is not enslaved to the other (as in current music) by rhythmic same-beatedness. In FREE MUSIC there are no scales - the melodic lines may slide & glide from & to any depths & heights of (practical) tonal space, just as they may hover around any "note" without ever alighting upon it. In other words, they have freedom of melodic movement, as a bird has (compared with an airship, which does "trips" between "destinations" - just as, in current music, melodic lines make trips between destinations). In FREE MUSIC harmony will consist of free combinations (when desired) of all free intervals - not merely concordant or discordant combinations of set intervals (as in current music), but free combinations of all the intervals (but in a gliding state, not needfully in an anchored state) between the present intervals ... For me, of course, my free music seems entirely inspired (heard in the inner ear) & that is why I feel so much duty towards it. It seems to me the only type of music that tallies our modern scientific conception of life (our longing to know life AS IT IS, not merely in a symbolistic interpretation), and clearly the kind of music to which all musical progress of many centuries has been working up. The irregular rhythms of Cyril Scott (adapted by him from my 1898 experiments & copied from Scott by Stravinsky & almost everybody else) are a half-way house towards FREE MUSIC ... FREE MUSIC, alone, uses all the resources of music as it stands ...'

### **FREE MUSIC MACHINE EXPERIMENTS 1946-1958**

#### SLIDING PIPE (FREE MUSIC) 1946

Original Grainger Museum Legend:

'July 2, 1946 White Plains, N.Y. (suggested by Burnett Cross, June 29, 1946). Grainger's first model (1946) for playing "gliding tones" with accurate control. When Burnett Cross saw this model he said "You might do better to have it upright, so that gravity will work for you at least in one direction." This led to other experiments.'

Invention June 14. 21. 22. 23. 24. 1946 White Plains' inscribed on base by Percy Grainger.

#### Percy Grainger's Daybooks 1944-1960

##### Excerpt: Friday 14 June 1946

'Bot sliding pipe from free music 1.00 N.Y. . . . worked till midnight on sliding-pipe invention for Free Music.'

##### Excerpt: Tuesday 2 July 1946

' . . . got 2 slide pipes working (eve, 1st time in musical history 2 slidingvoices played together?)'

#### PIANO, ELECTRICAL REPRODUCING (IG 5/2)

Weber electrical reproducing grand piano made in 1932 by Duo-Art, The Aeolian Company, New York & London. "Made in U.S.A. 16 P". Light, polished wood; 7 1/4 octaves; 3 pedals. Mechanism under 3 wooden panels; bellows serial no. 74. Metal frame. Weber serial no. 81558. 146cm wide x 98.5cm high x 165cm long. Origin: U.S.A. Provenance: Belonged to P.G.

Used extensively in free music experiments. Now located in research room and only used to play duo art piano rolls.

#### Percy Grainger's Daybooks 1944-1960

##### Excerpt: Monday 9 December 1946

'(thought about Free Music on differently-tuned Duoarte)'

#### Percy Grainger's Daybooks 1944-60

Excerpt: Friday 14 May 1948

'On way to Grand Central inquired re Solovox, was referred to Schirmers where I saw "Melanette" & took one home. Working with Melanette . . . '

Excerpt: Tuesday 25 May 1948

' . . . also experimented with 3 solovoxes.'

ORGAN, REED [FOLDING HARMONIUM] (IG 2/7-3:3)

Light wooden, portable, folding reed organ or harmonium, "Style M" made by Bilhorn Brothers, USA. [No serial number visible.] There are 5 octaves and 7 stops, each stop being marked with piece of sticking plaster indicating 4', 8', or 16' stop. Piece of sticking plaster marks position of middle C and another one has HARMONIUM written on it. Strings around several keys indicates that the instrument may have been used by PG for free music experiments. The bellows are leaking and there is a card stuck in under the lid which reads: "George J. Grathwohl, skilled maintenance and repair, pipe organs - reed organs 5099 Post Road, New York 71, N.Y." Instrument is 73cm high x 91cm wide x 42cm deep. Origin: U.S.A. Provenance: Belonged to P.G.

Percy Grainger's Daybooks 1944-1960

Excerpts:

Sunday 9 May 'Working at Free Music on Duoart (linking up keys to reed organ?) Cross came, suggested false key shld be attached to Reed O. Key, pulled by Duoart?'

10 May 'Working on Free Music, Duoart & Reed Organ . . . '

12 May 1948 'Silenced Duoart (felt between hammers & strings). Fixed many extensions to Duoart keys, which played well on Reed Organ.'

## EXPERIMENT WITH MOVIE SOUND-TRACK PRODUCTION OF FREE MUSIC

Percy Grainger's Daybooks 1944-1960

Excerpt: Friday 20 January 1950

'Burnett with film soundtrack, slide photographically got.'

Burnett Cross 'had an idea for producing Free Music from movie film (35mm) soundtrack, and produced a sample made in darkroom with enlarger.'

Excerpt: Saturday 21 January 1950

'12.45 Pix Theater. Heard B. Cross's first synthetic glide on sound-track, photographically produced.'

Burnett Cross: 'The movie sound-track production of Free Music was potent in theory, but practically too involved. It did not allow PG to work directly with the sounds, so it was abandoned. The manager of the Pix Theater (White Plains) ran the test film on his projector for us, before the regular show, at PG's request. The slide was there, PG was very pleased, but the process was too cumbersome.'

## EXPERIMENT ON SMITH'S ORGAN FLUTE PIPE

Percy Grainger's Daybooks 1944-1960

Excerpt: Wednesday 15 February 1950

'Cross 2.30 - 6.30. Worked (mother's room) at waxed paper (wide) on Smith's organ flute pipe, getting glides. Cross made gramophone copies.'

Burnett Cross: 'Smith was organ tuner for the First Baptist Church organ. PG obtained an organ pipe (metal) from him, for experiments.'

Excerpt Tuesday 14 March 1950

'Set up double-rollers with hanging mops, rolling pins, etc to press down paper on pipe experiment? starting cutting roll.'

Excerpt Wednesday 15 March 1950

'Cut roll experiments: got whole range of organ pipe to speak.'

Excerpt Sunday 2 April 1950

'PG worked out air pressure control on extra pipe (holes), before air from vacuum cleaner reaches pipe mouth?'

### EXPERIMENTS WITH REEDS AS USED IN ACCORDIONS, HARMONIUMS, AND REED ORGANS

Percy Grainger's Daybooks 1944-60

Excerpt: Friday 28 April 1950 'Burnett & I to Galanti accordions.'

Excerpt: 29 April 1950 'Burnett home with us, made Estey & Galanti reeds speak from airtight box, vacuum cleaner.'

Burnett Cross: 'The Galanti reedshad bases of different sizes, difficult to use. The Estey reeds had the same size base, whatever the size of the reed, easy to use in reed box.'

Excerpt: Monday 5 March 1951 'Burnett & PG got first perfect results from Reed box tone tool (single loop of paper, slits, etc.)'

### FREE MUSIC EXPERIMENTS WITH OSCILLATOR

Percy Grainger's Daybooks 1944-1960

Excerpt: Thursday 25 October 1951

'Red Letter day for Free Music [red ink] Burnett brot \$15 oscilator, having recorded 2-, 3- & 4-part trials with it at home. . . . I got sewing machine & drill to play oscilator [red ink]'

Burnett Cross: 'The oscillator was a Morse code practice device with a continuously variable pitch produced by a loudspeaker (in the case). Its single vacuum tube operated on house current (110 vols). PG at once set to work to find out how its pitch-knob could be controlled.'

Excerpt Thursday 29 November 1951

'Red Letter Day' [red ink] 10.15 B, E, PG Hischool, to see & fetch Branch's oscillator (splendid) made to B's order (\$6.00) Took it home, tried it, fine.'

Burnett Cross: 'Branch was a White Plains High School student skilled in electronics. We paid him to put together the vacuum-tube oscillators for what became the Kangaroo-Pouch machine, or tonetool. I found the circuit forthe vacuum-tube oscillator in a popular electronics magazine. Branch constructed 4 oscillators to that plan.'

Excerpt: Monday 18 February 1952

'Frame-work, doubledecker synchronising Kangaroo pouch flying disc model finished.'

Excerpt: Sunday 9 March 1952

'Red letter day for Free Music tonetool. First 2-sheet (2 yards high) paper roll for playing 4 or 6 oscillators by Kangaroo-pouch system (worked like a charm).'

Burnett Cross: ' The design of the Kangaroo-pouch machine, as shown, was entirely PG's. (I contributed details, such as the skatewheel mountings for the turrets.) A masterpiece of efficient construction!'

### PIANO, KNOXVILLE BUTTERFLY PIANO (WURLITZER) (IG 4/1-1-1)

Small, white painted piano; top has semi-circular shape. 26 white keys and 18 black keys. One of PG's experiments in Free Music. [Was tuned in 6th tones and used by Grainger in some of his Free Music]. No lid; 3 legs; 1 pedal. 77cm wide high x 72cm deep. Origin: U.S.A. Provenance: Belonged to P.G.

### **FREE MUSIC MACHINE EXPERIMENTS 1946-1958**

**7th in order:**

### BUTTERFLY PIANO (CONVERSION) (IG 4/1-1-1)

Knoxville Butterfly piano (Wurlitzer). Small, white painted piano; top has semi-circular shape. 26 white keys and 18 black keys. One of Percy Grainger's experiments in Free Music. Was tuned in 6th tones and used by Percy Grainger in some of his Free Music. No lid; 3 legs; 1 pedal. 77cm wide x 76cm high x 72cm deep. Origin: U.S.A. Provenance: Belonged to Percy Grainger.

Percy Grainger's Daybooks 1944-1960

Excerpt: Friday 6 June 1952

'Free Music Revamping Knoxville Butterfly Piano (Wurlitzer) & re-tuning it Three pitches to the 1/2 tone (got piano wire No. 13 from County Piano Co, \$2.25)'

Excerpt Saturday 7 June 1952

'Mr Hunt's tuner helped on below Finished converting Knoxville piano to Free Music'

Excerpt Saturday 14 June 1952

'Burnett worked at Pianola on piano, loosening it up. Tried Pianola on sample bit of roll (cut by Burnett) on Knoxville piano, sounded well. PG made 4 discs (for front) 3 (green, red, yellow) with gramophone records, 1 with Burnett's translucent blue plastic.'

### **8th in order:**

"ELECTRIC EYE" TONE TOOL CROSS-GRAINGER EXPERIMENTAL INSTRUMENT FOR PLAYING GRAINGER'S "FREE MUSIC" [third machine - never completed - one component in display case 9 - location of other components not known].

Percy Grainger's Daybooks 1944-1960

Excerpt: Sunday 7 July 1957

'Burnett showed off Electric Eye.'

Excerpt: Saturday 24 August 1957

'2.30-4.30 Burnett, testing light action on electric cell (uneven distribution).'

Excerpt: Wednesday 25 September 1957

'4.00 Burnett got good octave spacing with layers of blue transparent cellophane.'

'Burnett got rid of "hum" & "frying" noises in Electric eye machine, got good sharp rhythms.'

Excerpt: Thursday 12 February 1959

'Burnett got 2 voices going on Electric Eye machine.'

### **FOYER:**

#### **DISPLAY CASE ONE:**

"In 1943 Grainger made a kind of score with verbal instructions. This is available in photostat from the Grainger Archives, and is worth study not only because the experiment works, but also because it is prophetic of the Indeterminacy practised in the fifties by John Cage and his associates, and of the Process or Minimal musics evolved during the sixties and seventies by Steve Reich, Terry Riley, and others."

SOURCE: Wilfrid Mellers: *Percy Grainger.*, Oxford, Oxford University Press, 1992, p.141.

REFERENCE: Percy Grainger's music: Random Round. (MG9/18)

#### PHOTOGRAPH (N.A.)

Percy Grainger installing his Free Music Machine in the Grainger Museum, Australia, 1955. Photograph by Herald-Sun, Melbourne.

#### CATALOGUE

Kay Dreyfus: *Objects, Documents and Pictures to Reflect Upon: selected from the Grainger Museum and the Archives Collections of the University of Melbourne.*

University of Melbourne, University Gallery, 1978, pp. 24-34. (University Gallery Exhibition 27 February to 5 April 1978).

CATALOGUE (PA1/780.904)

René Block: “[Grainger] 2. Auf der Suche nach freier Musik: neue Tonsysteme, elektronische Klänge, Free-Music-Maschinen” in *Für Augen und Ohren: Von der Spieluhr zum akustischen Environment*, Berlin, Akademie der Kunst, 1980, pp. 103-117 with illustrations of Grainger/Cross Free Music experiments on pp.109-111. (Exhibition in der Akademie Der Künste 20. Januar bis 2. März 1980.)

CATALOGUE (PA1/780.904)

René Block: “A la recherche de la musique jaune” in *Eouter Par Les Yeux: Objets et environnements sonores*, ARC, Musée d’Art Moderne de la Ville de Paris, 1980, pp.9-39 with an illustration of Percy Grainger’s “Kangaroo-Pouch-Free-Music-Machine”, 1955, on page 15. (Exhibition du 18 juin au 24 août 1980.)

CATALOGUE (Uncatalogued)

Dick Higgins: “Music from Outside” in René Block: *The Readymade Boomerang: Certain Relations in 20th Century Art*. Sydney, Biennale of Sydney and Museum of Contemporary Art, 1990, pp.130-140. Reference to Percy Grainger on page 132.

**FOYER:**

**DISPLAY CASE TWO:**

“Grainger’s later American years were increasingly geared to an educational context. He had long dabbled in what we now call World Music; in the thirties and forties this interest grew obsessive. Grainger’s ethnomusicological work mattered not so much because of the startling acuity of the parallels he discovered between disparate phenomena: such as the music of the improvising polyphonists he heard in Polynesia, and the music of the then almost-unknown Perotin, twelfth-century *maitre de chapelle* at Notre Dame (to which he’d been introduced by the priest scholar, Dom Anselm Hughes). The prophetic implications of Grainger’s intelligence strike home when we note that an affinity such as Percy here observes proves to be a cornerstone of Steve Reich’s Process Music thirty or more years later. Reich visited exotic terrains in pursuit of his musical ideals; Grainger, fired by practical experience in a foreign field, was led by it into research.” SOURCE: Wilfrid Mellers: *Percy Grainger*, Oxford, Oxford University Press, 1992, p. 8.

PHOTOGRAPH (N.A.)

Ella and Percy Grainger working on the “Kangaroo Pouch” Free Music machine in their home in White Plains, New York, mid-1950s. Photograph by Burnett Cross.

DUO ART ROLL (RG J5/1-114-6:1)

Inscribed by Percy Grainger: “Sea-song sketch for 2 melanettes (to be accompanied by reed organ). About June 12 or 18, 1948.” [On “silk paper” attached to Duo-Art roll 0973 titled ‘Over Somebody Else’s Shoulder’: Fox-Trot and Song Roll by Lewis-Sherman. Played by Corinne De Bert.]

Percy Grainger inscription on duo-art roll box: “First Solovox trials, July 1, 1948. Seasong for 2 melanettes, June 1948. Silk paper.”

DUO-ART ROLL (RG J5/1-112-5:1)

Inscribed by Percy Grainger: “Sketch for Sea-Songs. Beatless Music Grainger - Grainger. 7/28 /22.”

Inscription on duo-art roll box: "From SAFE, E.G. 1962."

**FOYER:**

**DISPLAY CASE THREE:**

"In a society dedicated to a work-ethic man needed to relearn how to play, for, as Karl Bücher had pointed out as early as 1901 - when Percy was embarking on his early innovatory works - 'play is older than work, art is older than production for use'. *The Lonely Desert Man* is indubitably play, yet it also asks questions about what it means to be human. Although the desert man is a comic guy as well as a guise, he allegorizes the basic concerns of Grainger's life: which sought for a universal music beyond categorized artistic traditions and was itself creative of the values men and women could and should live by. His ambition was as grand as it was simple.

It was also this paradoxical man's ultimate paradox." SOURCE: Wilfrid Mellers: *Percy Grainger*, Oxford, Oxford University Press, 1992, p.137.

PHOTOGRAPH (N.A.)

Percy and Ella Grainger working on the "Kangaroo Pouch" Free Music machine in their home in White Plains, New York, mid-1950s. Photograph by Burnett Cross.

DUO-ART ROLL (RG J5/1/113-6:1

Inscribed by Percy Grainger: "Ella Grainger's "Love at First Sight" melody, cut by hand by P.A. Grainger, May 30, 1948, White Plains. accompaniment cut June 2, 3, 4, 1948. Ella Grainger's LOVE AT FIRST SIGHT, for Melanette & Reed organ, June 1948. Beyond it, Rachm. Prelude." [Attached to Duo-Art roll, The Aeolian Company, New York, 6525-8: Prelude, Op. 3, No. 2, C sharp Minor. Rachmaninoff. Played by Josef Hofmann.]

Percy Grainger inscription on duo-art box: "June, 1948. Ella's 'Love at First Sight' for Melanette & reed organ."

DUO-ART ROLL (RG J1/10-70-1:1

The Aeolian Company, New York, 6670-0: Franz [Ferencz] Liszt: Rhapsodie Hongroise No. 2. Played by Ignace Jan Paderewski.

This roll has additional cuttings by Percy Grainger as an introduction to this work. Grainger has dated them 30 May 1948 and 20 May 1948.

**SOUTH GALLERY:**

**DISPLAY CASE FIVE:**

FREE MUSIC COMPONENTS (IG 6/1:1)

SUSPENDED OBJECTS:

"PITCH-ARMS"

A selection of Ella and Percy Grainger's variations of "pitch-arms", which rode on the "Hills-and-Dales" graph, turning as it moved along the edge of the paper. The "pitch-arms" rise and fall controlled the pitch of the vacuum-tube-oscillator.

Model II "Pitch-arms"

Inscribed by Percy Grainger: "Oct 31, 1951. Ella's idea, Oct. 31, 1951, cotton reels instead of skate wheels."

Model III "Pitch-arm"

Inscribed by Percy Grainger: "Nov. 5, 1951. Ella's idea: small cotton reels instead of larger ditto. PG's idea: plastic tubing instead of cardboard cylinder."

Model IX "Pitch-arm"

Nov. 6, 1951.

Inscribed by Percy Grainger: "Wooden end added late Nov or early Dec, 1951."

"Pitch-Arm" Unnumbered.

Metal rod, 2 ping-pong balls, clear plastic tube two red silk threads inside.

COLLECTION OF "GUILLOTINES": "HILLS-&-DALES RIDERS"

A. Parallel metal wire springs. Metal frame with revolving clear plastic tube and green painted wooden plugs inside [no date].

B. Same as A, with blue wooden plugs. Percy Grainger dated: "June 19, 51."

C. Similar to A and B, with red wooden plugs. Percy Grainger dated: "May 9, 1954."

D. Variation: Clear plastic platform, red plugs and red plastic discs.  
Percy Grainger dated: "1954 March 9."

E. Variation: PRESS [brand] board platform. One blue large wooden plug, protruding rivet with star decoration. Percy Grainger dated: "June 26, 1953."

F. Variation: Parallel metal rods, two cross bars of white plastic knitting needles. Wooden platform.  
Percy Grainger dated: "Dec. 21 1951."  
Clear plastic revolving cylinder lashed together with thread and masking tape.

COLLECTION OF "RIDERS" for the 'HILLS-&-DALES' GRAPHS

An earlier type, pre "Kangaroo Pouch" machine. Some constructed from childrens' 1940's recordings in black, green, and red. Others in blue, green, and yellow plastic. One in all aluminium. All with turrets of perforated metal, recycled Kodak film tins, MYSTIK [brand] tape tins. Some with buttons on the central spindles. All dated by Percy Grainger c.1952-1953.

**DISPLAY CASE FIVE:**

PERCY GRAINGER'S FREE MUSIC:

PHOTOCOPIES OF ORIGINALS HELD BY THE GRAINGER MUSEUM.

MUSIC (MG5/21-2)

Free Music No. 2 for 6 Theremins.

Single page of graph paper dated October-December (1935-36?).

Photostat positive.

MUSIC (MG5/21-5)

Beatless music composed for strings.

3 pages of graph paper dated 1907.

Photostat positive.

Inscribed by Percy Grainger: "Arranged for 6 theremins", and "Oct. 15-16, 1937. Bigelow Homestead."

MUSIC (SLI MG3/30-3)

Sheet of notes of "Free Music ideas, Cedar City, Utah, 21 February, 1943".

Single sheet of note paper.

MUSIC (SLI MG3/30-2)

Score of 'reworked version' October 6, 1935.

MUSIC (MG3/79:1)

Sea-Song

Sketch for "Sea Songs" style.

1. Double sheet showing the difference between

(A) Regularly barred music

(B) Irregularly barred music

(C) Beatless music

(for Duo-Art pianola).

MUSIC (SLI MG3/30-4: 5)

"Player-Piano Experiments".

1 sheet [out of 6] dated May 5, 1948.

MUSIC (SLI MG3/30-4:3)

**LONDON ROOM:**

**DINING TABLE SETTING:**

"MUSIC ROLLER DESK" (N.A.)

Percy Grainger's Daybooks 1944-1960

Excerpt Friday 30 November 1951

'PG practising with page turner.'

Burnett Cross: "The page turner (music roller) was operated by turning a small cylinder (strapped to the pedals support of the grand piano) with the left foot. Rotating the cylinder, in either direction, rotated the rolls of the page turner, thus moving the paper roll on which strips of music were pasted. PG quickly became adept at shifting his left foot between pedal and cylinder, and rotating the cylinder the right amount. But it did take practice."

## PERCY GRAINGER'S TOOLS AND CARPENTRY EQUIPMENT

### TRAY SETTING

Rose Grainger's wooden tray with inlaid floral design and brass handles.

Rose Grainger's china, white with rosebud pattern, Victoria brand.

Ella Grainger's coffee cup and saucer, white with peasant design, Lunéville, France.

Ella Grainger's copper teapot.

Percy Grainger label: "On lower shelf, south table, of beloved mother's bedroom at time of her death."

### HANDKERCHIEF (N.A.)

Cotton striped border. Unwashed condition, as found in the pocket of a jacket prior to conservation in 1989.

### **PERCY GRAINGER COLLECTION:**

#### TOWEL JACKET (850)

Made by Ella Grainger from Jacquard woven towels.

Cream and beige.

Border of henna and brown in a geometrical design.

Loose jacket.

Soft, rolled collar.

Long, shaped sleeves.

#### BOOTS (204)

Brown leather lace up boots.

#### SOCKS (289)

Typical workman's socks. 45C. Made in U.S.A.

#### TOWEL CLOTHES (677)

Made and worn by Ella Grainger.

White, rust and brown towel.

Red zipper front closure, with red plastic shoe toggle attached.

#### SEWING BOX (N.A.)

Round red lacquer sewing box with sewing implements and thread intact.

## **DISPLAY CASE 7**

### **FROM RIGHT TO LEFT**

#### **PERCY GRAINGER'S FREE MUSIC DRAWING**

##### **"KANGAROO POUCH" METHOD OF SYNCHRONISING & PLAYING EIGHT OSCILLATORS**

SIZE: 35.5cm. x 21.6cm.

Back view, undated, [c.1952]

Pencil, Indian ink, water-colour, silver paint on on a paper concert program.

Printed verso: "South Western Louisiana Institute presents . . . Percy Grainger . . . December 14, 1949."

Percy Grainger inscribed description and operational details.

#### **FREE MUSIC COMPONENT (IG 6/1:1)**

##### **"RIDER" FOR VOLUME-CONTROL GRAPH ON "KANGAROO POUCH" MACHINE. 5 APRIL, 1955.**

A collection of three "riders" with round perforated holes in the metal disc and cap. Metal spindle. One with a round yellow, green, and red plastic disc.

Identification by Burnett Cross, November 1988: "Percy (& Ella) made many, of different colours and materials."

#### **PERCY GRAINGER'S FREE MUSIC DRAWING**

##### **SKETCH FOR SYNCHRONISATION OF 2 OSCILLATOR-PLAYING TONE-TOOLS.**

Side-ridge, Scotch tape tin, plastic clothes line method.

Size: 21.9cm. x 27.9cm.  
Drawn 11 February 1952, Winston Salem, N.C.  
Water-colour on dyeline reproduction.  
1st sketch-model, made Canada, January 1952.  
Percy Grainger inscribed description and operational details.

#### FREE MUSIC COMPONENTS (IG 6/1:1)

##### “RIDER” A LATER VERSION FOR THE “KANGAROO POUCH” MACHINE

Metal frame with a revolving wooden disc (fabricated by Percy Grainger from a wooden door-nob) with a yellow plastic and silver foil disc. Frame dated 18 July, 1954.  
Foil disc dated by Percy Grainger: “June 15-17 ‘54.”

##### “RIDER” FOR ‘KANGAROO-POUCH’ MACHINE

Metal frame mounted on perspex secured by wood and surgical plaster. Percy Grainger dated: “Jan. 8, 55” Revolving disc and converted wooden door-nob dated by Percy Grainger: “Jan. 8, 55.”

##### “SLED” FOR “KANGAROO POUCH” MACHINE

Revolving disc, centre wood, outer flanges cardboard, dated “Ap. 26‘54. Burnett.” Secured by a screw, washer and central metal rod through a wooden block. Two pairs of metal wings each side with revolving reels.

Burnett Cross, November 1988: “Different attempts to make metal contacts for the “on-off” system. When the contacts touched a strip of aluminium foil (pasted on the graph ‘hills-and-dales’ at its base), the sound of the oscillator (on the Kangaroo-Pouch machine) would be silenced. Rubber bands were to hold the metal contacts firmly against the aluminium foil. What seemed an easy thing to do turned out otherwise. Eventually we found that a sliding contact (PG called it a “sled”) worked best.”

#### PERCY GRAINGER’S FREE MUSIC DRAWING

##### MODEL FOR SIDE-RIDGE CLOTHES-LINE-&-SCOTCH-TAPE-TIN OSCILLATOR-PLAYER

Size: 27.9cm. x 21.6cm.  
Percy Grainger dated: “Made in train Sask., Canada, Jan. 19, 1952. Marlboro Hotel, Prince Albert, Sask., Jan. 19-20, 1952. Horwood Hotel, Moose Jaw, Sask., Jan. 14, 1952.  
Painted Sunday Jan. 27, 1952, Wilson Hotel, Salt-Lake City, Utah.”  
Pencil, Indian ink, water-colour on paper.  
Percy Grainger inscribed “To beloved Ella from Percy, Jan., 27, 1952.”

#### FREE MUSIC COMPONENTS (IG 6/1:1)

##### “GUILLOTINE”.

Revolving device screwed to two wooden blocks. The revolving perspex cylinder is on a metal rod with a blue wooden plug each end. Blue plastic support for two spiral metal springs which are sewn on. Percy Grainger dated: “June 18 ‘53.”

##### GUILLOTINE

Frame consists of an outer parallel section of heart shaped brass rods. Gold faced cardboard mount with a metal wire spindle with two red buttons and one metal washer. Revolving metal rod with two large yellow beads and a yellow silk reel. Entirely held together with clear sticky tape and sewing threads.  
Percy Grainger: “Ella’s ideas (brass tubes, beads) Dec. 22, 1951.”

### “RIDER”

Double yellow plastic circular discs, perforated metal turret.

Percy Grainger dated “Dec. 14 ‘52.”

Fine metal spire, round eyelet, mounted with bright pink plastic button.

Base dated by Percy Grainger “Dec. 14, ‘52.”

Burnett Cross November, 1988: “What PG called a ‘guillotine’ - was an early attempt (one of many) to make a ‘Hills-and-Dales’ Rider.”

## **MIDDLE SECTION**

### PERCY GRAINGER’S FREE MUSIC DRAWING

#### “HILLS-&-DALES” AIR-BLOWN-REEDS TONE-TOOL NO. 3

Cardboard or brown paper graph, rising & falling pitch-arm, rising & falling air-jet, single Estey reed-box of 63 reed-cells, toy balloon air-ducts.

Size: 27.9cm. x

24.0cm.

Made late October, 1951.

Sketched November 29-30, 1951.

Pencil, Indian ink, water-colour, silver paint on paper concert program.

Printed verso: “Troy State Teachers College presents Percy Grainger . . . November 7, 1949.”

### FREE MUSIC COMPONENTS (IG 6/1:1)

#### GUILLOTINE

Centre section a reel of black cotton covered with a plastic tube. Only centre section revolves. Both lower sections are shaped wooden dowels and black plastic tubes. A nail protrudes through each dowel. Top section of plastic and dowel sewn together. Lower section held by elastic bands. Percy Grainger dated: “Dec. 11, 1951.”

#### TRACKER-BAR

Section of rubber hose. String loop sewn in one end. A flattened section of metal tube attached to the other end with clear sticky tape. Percy Grainger dated “June 11, 1951.”

Burnett Cross November 1988: “Metal tracker-bar slot connected to rubber hose by PG, or perhaps a nozzle for blowing air into reed box openings - an early idea.”

#### TRACKER-BAR AND TWO WOODEN REED-BOXES

One box with four black rubber tubes attached.

Percy Grainger: “Burnett, about June 10, 1951”.

Percy Grainger: “Burnett, about June 11, 1951.”

Burnett Cross’ label: “Experiment to combine two reed-boxes with a single tracker bar. Would have had a second set of pipes running off the other side.”

#### “PITCH ARM”

Long, thin, pointed revolving metal rod. A metal washer on one end. Long, clear plastic cylinder, pink silk reel of thread, centre wooden dowel, green silk reel of thread, toy rubber wheel. Remains of rubber band.

Percy Grainger inscribed: “Ella, PG, Nov. 5, ‘51. E’s idea: pretty silk reels, PG’s idea 1 larger wheel instead of 4 smaller ones.”

Percy Grainger dated: “Nov. 3 (or 5), 1951.”

### PERCY GRAINGER’S FREE MUSIC DRAWING

“HILLS-&-DALES” AIR-BLOWN-REEDS TONE-TOOL, NO. 6

Double-decked reed-boxes with 126 reeds

rising & falling, 1/2-yard-long air-blowing plastic tube, 41-inch high brown paper graph, toy balloon air-ducts .

Size: 25.6cm. x 34.7cm.

Made November 19-23, 1951

Sketched November 26, 1951.

Pencil, Indian ink, water-colour on paper concert program.

Printed verso: “Troy State Teachers College presents Percy Grainger . . . Nov. 7, 1949.”

**LEFT SECTION**

PERCY GRAINGER’S FREE MUSIC DRAWING

OSCILLATOR-PLAYING TONE-TOOL, 3RD EXPERIMENT

Size: 14.2cm x 27.9cm.

Made first days of November 1951.

Sketched November 24, 1951.

Pencil, Indian ink, water-colour, silver paint on concert program.

Printed Verso: “Troy State Teachers College presents Percy Grainger . . . November 7, 1949.”

FREE MUSIC COMPONENTS (IG 6/1:1)

“PITCH-ARM”

Metal and wooden dowel with 2 revolving ping-pong balls. Revolving central section of clear plastic tube contains a reel of pink and yellow silk thread. Dowel at one end with metal eye.

Percy Grainger dated “Dec. 26, 1951.”

Inscribed by Percy Grainger: “Dec. 26, 1951.”

GUILLOTINE

Two parallel aluminium rods supporting a wooden dowel on each, with horizontal rods i.e. sections of grey and white plastic knitting needles. A revolving reel of two shades of pink silk. Wire loop.

All secured with clear tape or threads.

Percy Grainger dated: “Dec. 20, 1951.”

PERCY GRAINGER’S FREE MUSIC DRAWING

“HILLS-&-DALES” AIR-BLOWN-REEDS TONE-TOOL, NO. 1

Masonite graph, up-&-down piston, 3-fold air-jets playing on Estey reed-boxes.

Size: 27.2cm. x 27.8cm.

Made July 28, August 2-3, 1951.

Sketched November 29, 1951.

Pencil, Indian ink, water colour, silver paint on paper concert-program.

Printed verso: “Troy State Teachers College presents Percy Grainger . . . November 7, 1949.”

FREE MUSIC COMPONENTS (IG 6/1:1)

WOOD BLOCK SUPPORTING FOUR BLACK RUBBER TUBES

Rubber tubes protruding from both ends. Longer ends of tubes capped with sections of bamboo secured with clear tape.

Percy Grainger dated: "PG, about June 5-6, 1951. W.P."

### COMPONENT

Similar to the above, smaller at base with no protrusions and no caps.

Percy Grainger dated: "PG, about June 5, 1951. W.P."

### PERCY GRAINGER FREE MUSIC DRAWING

#### "HILLS-&-DALES" AIR-BLOWN-REEDS TONE-TOOL, NO. 5

Brown paper graph, rising & falling 54-inch-long air-blowing plastic tube, single Estey-reed reed-box with 63 reeds, toy balloon air-ducts.

Size: 14.2cm. x 27.9cm.

Made November 18-19, 1951.

Sketched November 30, 1951.

Pencil, Indian ink, water-colour, silver paint on paper concert program.

Printed verso: "Troy State Teachers College presents Percy Grainger . . . November 7, 1949."

### FREE MUSIC COMPONENTS (IG 6/1:1)

#### GUILLOTINE

Cardboard base supporting two parallel, cut-down-in-size, clear glass tooth-brush cases labels 'Exton - sealed in glass for your protection - brand.' Rubber section attached either end. Horizontal rod is a section of white plastic knitting needle with a revolving section of clear plastic tube. Inside of the clear plastic tube is two wood sections and metal washers. Constructed with clear plastic and sewn or lashed together with heavy thread.

Percy Grainger dated: "Dec. 21, 1951."

#### GUILLOTINE

Cardboard with foil base. Two parallel metal rods - one horizontal with a revolving ping-pong ball each end. Centre washers and clear plastic section with wooden plugs. Wire hook with a metal washer and two red buttons. Constructed, sewn, or lashed together with heavy threads.

Percy Grainger dated: "Dec. 28, 1951."

### DISPLAY CASE 8

#### LEFT SIDE

#### PHOTOGRAPH (N.A.)

Ella Grainger contemplates the 'Kangaroo Pouch' Free Music Machine while seated at her writing desk in the living room of her home at White Plains, New York.

#### BACK RIGHT

#### PHOTOGRAPHS

#### FROM TOP

#### PHOTOGRAPH (N.A.)

Cross-Grainger experiments, February 1950. Organ pipe, gliding tones (holes 1/3 of half-tone apart) controlled by perforated paper. Photograph by Burnett Cross.

PHOTOGRAPH (N.A.)

Cross-Grainger experiments, 1950. "Sea-Song" sketch, three solovoxes played by pianola roll. Photograph by Burnett Cross.

PHOTOGRAPH (N.A.)

Percy Grainger Legend: "Cross-Grainger experiments, free music, Feb. 1950. Gliding tones on whistle notes on recorders produced by holes & slits cut in paper rolls."  
Photograph by Burnett Cross.

ADVERTISING DISC

Parker Pens 'Factory Service Chart.  
Two rotating circles suitable to recycle for experiments.  
Percy Grainger: 'Oct. 1952'.

PHOTOGRAPH (N.A.)

Inscribed by Percy Grainger: "Photograph of Kodak Movie Sound Track. Maurer film ribbons. Free Music. J.A. Maurer, Inc. Oct. 29, 46 (Stone). Variable density, 500 cycles."

Percy Grainger's Daybooks 1944-1960

Excerpt: Friday 18 October 1946

'with B. Cross saw Stone at Teachers College, Columbia University about inventing sliding tone instrument for Free Music & gear for noting down folksongs by vibrations.'

Burnett Cross: "Clarence Stone was on the staff of the Physics Department of Columbia University, a consulting engineer and inventor."

Excerpt Friday 20 January 1950

'Burnett with film soundtrack, slide photographically got.'

Excerpt Saturday 21 January 1950

'Pix Theater. Heard B. Cross's first synthetic glide on [35mm movie film] sound-track, photographically produced.'

BACK LEFT

PHOTOGRAPHS (N.A.)

Two photographs of Percy Grainger working on "Kangaroo Pouch" Free Music Machine, White Plains, New York, c.mid-1950's. Photographs by Burnett Cross.

,

CASE 8

LEFT SIDE BACK

PERCY GRAINGER'S FREE MUSIC. 1951

Graph. Brown paper. Perforated and inscribed by Percy Grainger "The first time accurately controlled gliding chords have been sounded in musical history (as far as I know) Sept. 29, 1951."  
Size: folded 92cm. x 182cm.

LEFT SIDE BACK

PERCY GRAINGER'S FREE MUSIC DRAWING

"HILLS -&-DALES" AIR-BLOWN-REEDS TONE TOOL, NO. 2

SIZE 14.2cm. x 27.2cm.

Made late October, 1951.

No separate date for the sketch.

Inscribed by Percy Grainger "Cross-Grainger Experimental Instruments for playing Grainger's "Free Music" (1951)." "(Masonite graph, up-&-down piston, 4-fold air-jets hung from above playing on Estey reed-boxes, toy balloon air-ducts)".

Pencil, ink, water-colour, silver paint.

#### FLOOR

#### OSCILLATOR PLAYING INSTRUMENT MODELS V, VI, VII

Percy Grainger Legend: "4 skate-wheels, Nov. 5, 1951 changed to 5 skate wheels, Nov. 6, 1951. It was Ella's idea that the skate wheels be attached to the masonite wall (up-down which the pitch arm runs) instead of being attached to the pitch-arm (to lighten pitch-arm)".

Five skate-wheels, each one to rotate on an extra large size nail stitched onto a portion of a recycled, heavy cardboard box.

#### FLOOR

#### PIANOLA ROLL. EXAMPLE OF SECTION ONLY.

#### HANGING FROM TOP OF CASE

#### COMPONENT FREE MUSIC MACHINE.

Percy Grainger Legend: "Component free music machine. Pressure system electrolux to reed-box June 21, 1951. 4.45am - 9am."

Handle inscribed by Percy Grainger "June 21, 1951".

Recycled cardboard construction, glue and string.

#### ORGAN, REED [FOLDING HARMONIUM] (IG 2/7-3:3)

Light wooden, portable, folding reed organ or harmonium, "Style M" made by Bilhorn Brothers, U.S.A. [No serial number visible.] Five octaves and 7 stops, each stop being marked with a piece of sticking plaster indicating 4', 8', or 16' stop. Piece of sticking plaster marks position of middle C and another one has HARMONIUM written on it. Strings around several keys indicates that the instrument may have been used by Percy Grainger for free music experiments. The bellows are leaking and there is a card stuck in under the lid which reads: "George J. Grathwohl, skilled maintenance and repair, pipe organs - reed organs 5099 Post Road, New York 71, N.Y."

Instrument is 73cm high x 91cm wide x 42cm deep. Origin U.S.A. Provenance: Belong to Percy Grainger.

#### Percy Grainger's Daybooks 1944-1960

#### Excerpts: 9 May, 10 May, 12 May, 1948

Sunday 9 May: 'Working at Free Music on Duoart (linking up keys to reed organ?) Cross came, suggested false key shld be attached to Reed O. Key, pulled by Duoart?'

Monday 10 May: 'Working on Free Music, Duoart & Reed Organ, carrying out Cross's.'

Wednesday 12 May: 'Silenced Duoart (felt between hammers & strings). Fixed many extensions to Duoart keys, which played well on Reed Organ.'

#### **DISPLAY CASE 9**

#### TOP CENTRE:

#### MODEL 'FEEDER EATER' REVOLVING TURRETS, 17, 19 February 1954.

Small wooden and wood dowel model constructed with screw and string still attached. Recycled cardboard cylinders form revolving turrets. Inscribed by Percy Grainger with dates "February 17. 19. 1954".

#### Percy Grainger's Daybooks 1944-1960

#### Excerpt: Tuesday 16 February 1954

'E [Ella], PG started small 2-in-1 model.'

#### Excerpt: Wednesday 17 February 1954

'El [Ella], PG finished 2-in-1 model.'

#### CENTRE (SUPPORTING MODEL ABOVE)

##### MIDDLE OCTAVE, LOWER AND TOP BAR 4-DECKER SET UP

Constructed by Percy Grainger as part of a mechanism for free music. Two wooden parallel bars with three wooden cross dowels as supports with three shorter cross dowels. Brass eyelets with multiple strings and cords still attached. Inscribed by Percy Grainger in pencil on left front dowel and right front dowel "Middle octave, lower bar 4 - decker set-up" and "Middle octave, top bar 4 - decker set-up" [undated].

#### FLOOR CENTRE

##### DOUBLE REED BOX SINGLE TRACKER BAR 11 December, 1954.

Constructed by Percy Grainger. A wooden and plywood box nailed and screwed together. White metal painted bar. Metal screw eyes with strings still attached. Walls of 2-timing tracker bar lined with green, yellow and red plastic. Inscribed by Percy Grainger with musical notations 'dated 11 Dec. '54'.

##### Percy Grainger's Daybooks 1944-1960

##### Excerpt: Saturday 11 December, 1954

'PG finishing wooden upholders of low double-reed box. Burnett with PG, tuning lowest reedboxes.'

#### FLOOR RIGHT

##### PERCY GRAINGER LEGEND 'DUO ART SILENCER 1951

##### Free Music Machine Accessories & Components (IG 6/1:1+)

A selection: 1 wooden block, string nails and heavy metal staples.

1 carved and shaped block with a spiral metal spring

1 rounded notched blocks

1 block with masonite nailed together and 4 metal eyes

inscribed by Percy Grainger: 'May 15, 1949 to a Nordic Princess'.

##### PERCY GRAINGER ITEMS: NOTES BY BURNETT CROSS. NOVEMBER, 1988

##### (COMPONENT BOX NO. 48)

Excerpt: 'DUO-ART SILENCER': PG rigged up a system for muting the strings of the duo-art piano that involved bits and pieces of wood tucked into corners of the case. That's what these bits and pieces are, but just how they are assembled inside the piano I do not know.'

#### FLOOR RIGHT

##### PART OF THE LAST FREE MUSIC MACHINE ELECTRONIC MUSIC COMPONENT

[identified by Burnett Cross]

Support for component A recycled undressed timber plank with additional pieces screwed on to one end as an extension. One side of plank supports three curved aluminium reflectors secured in place by small, glued on wooden chocks. Three small bulbs and wiring.

Reverse side of planks supports two heavy cardboard panels secured by screws and washers to house the 'oscillator' mechanism. Both 'oscillator' panels are inscribed in ink by Percy Grainger with technical data.

#### FLOOR LEFT

##### 4TH REED BOX 23, 24, 25 AUGUST 1954

Constructed by Percy Grainger from wood, plywood, metal screws and angle brackets, painted metal track. Tracker bar lined with red, flue, green and yellow plastic. Inscribed by Percy Grainger on side "Aug. 2, 3-24 1954" and on front "Aug. 25, 1954".

##### Percy Grainger's Daybooks 1944-1960

Excerpt: Monday 23 August 1954

'Fordham, big plank (4-ply) for back of 4th reedbox'

Excerpt: Tuesday 24 August 1954

'Bought L-braces, small saws at McCowan's.'

Excerpt: Wednesday 25 August 1954

'Early to McCowan's, large L-braces. Almost finished 4th reed box.'

#### FLOOR BACK

LINOLEUM 'HILLS AND DALES' GRAPH (undated)

Inscribed in ink by Percy Grainger, "E. BD. F#. C#. AD(A). G. D-H(E). SHARP D. Low B."

MASONITE 'HILLS AND DALES' GRAPH. About 29 July 1951

Inscribed in ink and red crayon by Percy Grainger "About July 29, 1951". String attached.

MASONITE 'HILLS AND DALES' GRAPH. 1ST AUGUST 1951

Long graph with an extension of masonite joined with sewn string. Inscribed by Percy Grainger with date.

Percy Grainger Legend enclosed with these and others in the collection of graphs "Nov. 16, 1951, reed box played by long plastic tube on 'Hills and Dales' "

Percy Grainger's Daybooks 1944-1960

Excerpt: Friday 16 November 1951

'Red letter [red ink] Burnett saw single jet (inside 4 wooden guides) work.'

#### BACK LEFT

##### PHOTOGRAPHS

##### FROM TOP

##### PHOTOGRAPH (N.A.)

Grainger in his home at 7 Cromwell Place, White Plains, New York, working on Cross-Grainger free music experiments, early 1950's: an early form of reed-box tone-tool. Photograph by Burnett Cross.

##### PHOTOGRAPH (N.A.)

Photo cell controlled audio oscillator and audio photometer section of a free music machine. Photograph by Burnett Cross.

##### PHOTOGRAPH (N.A.)

Cross-Grainger Eater free music machine, c.1951. White Plains, New York. Photograph by Burnett Cross.

##### PHOTOGRAPH (N.A.)

"Electric Eye" machine in dining room, seen from hall, White Plains, New York. Photograph by Burnett Cross.

#### **DISPLAY CASE 10**

##### PERCY GRAINGER'S FREE MUSIC DRAWING [SEWING MACHINE]

### OSCILLATOR-PLAYING TONE-TOOL, 1ST EXPERIMENT

Size: 14.2cm x 25.7cm.

MADE OCT. 25, 1951. SKETCHED NOV. 23, 1951.

Inscribed by Percy Grainger with operational information, name of machine and date.

Pencil, indian ink, water-colour and silver paint on paper concert program. Printed verso: Troy State Teachers College presents Percy Grainger. November 7, 1949.

Percy Grainger's Daybooks 1944-1960

Excerpt: Thursday 25 October 1951

'Red letter day for free music [red ink]. Burnett brot \$15 oscilator, having recorded 2-, 3-, & 4-part trials with it at home. I got sewing machine & drill to play oscilator.' [red ink]

Burnett Cross: "The oscillator was a Morse code practice device with a continuously variable pitch produced by a loud speaker (in the case). Its single vacuum tube operated on a house current (110 vols). PG at once set to work to find out how its pitch-knob could be controlled".

### PERCY GRAINGER'S FREE MUSIC DRAWING

#### OSCILLATOR "CODEMASTER" [2nd oscillator playing tone-tool]

Size: 14.2cm x 28cm.

SKETCHED NOV. 22 OR 23, 1951.

Inscribed by Percy Grainger with operational information, name of machine and date.

Pencil, indian ink, water-colour on paper concert program. Printed verso: Troy State Teachers College presents Percy Grainger. November 7, 1949.

Percy Grainger's Daybooks 1944-1960

Excerpt: Sunday 28, Monday 29, Tuesday 30 October 1951

'These days built supporting scaffolding for oscillator-player (with & without drill; the latter B.C.'s idea) getting lever to work directly from revolving cardboard cylinder onto oscillator shaft.'

Excerpt: Wednesday 31 October 1951

'Ella woke up with 2 ideas: use gauze on buckram (oscillator-playing) graph & cotton reels instead of skate wheels at end of pitch arm. Both quickly tried & adopted. About this day Cross & PG at Pickard's bought new drill (\$2.50) to use (inst. of old drill) in oscillator-playing instr. First cardboard graph [red ink] Gauze at once changed to thin cardboard, Oct 31.'

#### SINGER SEWING MACHINE (N.A.)

'Treadle' foot action. Early 20th century. Metal frame and mechanism. Wooden bench top and two drawers. Box of original attachments. Singer Manfg. Co. made U.S.A. Y2244537.

### **PERMANENT DISPLAYS. FREE STANDING IN SOUTH GALLERY.**

#### **DISPLAY CASE ?**

#### "KANGAROO POUCH" TONE TOOL CROSS-GRAINGER EXPERIMENTAL INSTRUMENT FOR PLAYING GRAINGER'S "FREE MUSIC" 1952.(IG 5/1:1)

#### **DISPLAY CASE ?**

#### REED-BOX TONE TOOL CROSS-GRAINGER EXPERIMENTAL INSTRUMENT FOR PLAYING GRAINGER'S "FREE MUSIC" 1951.(IG 5/1:2)

#### **DISPLAY CASE ?**

#### FIRST FREE MUSIC MACHINE 1946. (IG 6/1:2)[in glass display case]

Original Grainger Museum Legend.

'July 2, 1946 White Plains, N.Y. (suggested by Burnett Cross, June 29, 1946).'

Museum legend: 'Graingers first model (1946) for playing "gliding tones" with accurate control. When Burnett Cross saw this model he said "You might do better to have it upright, so that gravity will work for you at least in one direction." This led to other experiments.'

### **DISPLAY CASE ?**

**MUSEUM LEGEND [displayed on wall on left side of "Kangaroo Pouch" machine] by Burnett Cross, 1983.**

"ELECTRIC EYE" TONE TOOL CROSS-GRAINGER EXPERIMENTAL INSTRUMENT FOR PLAYING GRAINGER'S "FREE MUSIC" [third machine - never completed - one component in display case 9 - location of other components not known].

### **DISPLAY CASE ?**

#### BUTTERFLY PIANO (CONVERSION) (IG 4/1-1-1)

Knoxville Butterfly piano (Wurlitzer). Small, white painted piano; top has semi-circular shape. 26 white keys and 18 black keys. One of Percy Grainger's experiments in Free Music. Was tuned in 6th tones and used by Percy Grainger in some of his Free Music. No lid; 3 legs; 1 pedal. 77cm wide x 76cm high x 72cm deep. Origin: U.S.A. Provenance: Belonged to Percy Grainger.

Percy Grainger's Daybooks 1944-1960

Excerpt: Friday 6 June 1952

'Free Music Revamping Knoxville Butterfly Piano (Wurlitzer) & re-tuning it Three pitches to the 1/2 tone (got piano wire No. 13 from County Piano Co, \$2.25)'

Excerpt Saturday 7 June 1952

'Mr Hunt's tuner helped on below Finished converting Knoxville piano to Free Music'

Excerpt Saturday 14 June 1952

'Burnett worked at Pianola on piano, loosening it up. Tried Pianola on sample bit of roll (cut by Burnett) on Knoxville piano, sounded well. PG made 4 discs (for front) 3 (green, red, yellow) with gramophone records, 1 with Burnett's translucent blue plastic.'

### **DISPLAY CASE 11**

#### PHOTOGRAPH (N.A.)

Background enlarged photograph of Percy and Ella Grainger's kitchen, White Plains, New York, c1950's. Originally exhibited in the '2nd Face - Grainger the Composer and Innovator: White Plains, New York', The Three Faces of Percy Grainger, at The Performing Arts Museum, Victorian Arts Centre, Melbourne, 29 July - 29 September, 1985. Photograph by Burnett Cross.

#### FROM THE TOP:

#### PHOTOGRAPH (N.A.)

Percy Grainger on the porch of his home at White Plains, New York, working on components of his free music machines. Photograph by Burnett Cross, mid-1950's.

#### PHOTOGRAPH (N.A.)

Percy Grainger pasting aluminium foil on a free music brown-paper graph in the kitchen of his home, White Plains, New York. Photograph by Burnett Cross, mid-1950's.

Percy Grainger's Daybooks 1944-1960

Excerpt: Tuesday 21 October 1952

'Burnett, PG putting new graphs & control paper (Kangaroo pouch machine) on, cutting it out on kitchen floor etc. Tied to attach graphs with "postage-stamp-size" Scotch tape, wouldn't stay. Had to take it off, put on kitchen floor again.'

PHOTOGRAPH (N.A.)

Percy Grainger cutting out graph paper. Photograph by Burnett Cross, mid-1950's.

PHOTOGRAPH (N.A.)

Percy Grainger [back view] going up verandah stairs of his home at White Plains, New York, carrying "junk". Photograph by Burnett Cross, mid-1950's.

ORIGINAL BROWN PAPER GRAPH FOR "KANGAROO POUCH" TONE-TOOL CROSS-GRAINGER EXPERIMENTAL INSTRUMENT FOR PLAYING GRAINGER'S "FREE MUSIC", 1955. ("N.A.")

Inscription by Percy Grainger: "March 23, 1955." "March 29, 55, for same-time-ment."

Brown paper inscribed by Percy Grainger in red crayon, red ink and pencil. Silver aluminium foil attached to some lower edges, also section of blue fabric attached with glue. Repairs with adhesive tape probably more recent additions.

**DISPLAY CASE 12**

PERCY GRAINGER FREE MUSIC DRAWINGS

"UNTITLED" (PITCH-ARMS) MODEL IV NOV. 5, 1951. MODEL VII, VIII, IX

Size: 14.2cm. x 27.9cm.

Pencil, Indian ink, water-colour on paper concert program.

Printed verso: "Troy State Teachers College presents Percy Grainger . . . November 7, 1949.

OSCILLATOR-PLAYING TONE-TOOL 3RD EXPERIMENT (PITCH-ARMS)

14.2cm. x 27.9cm.

Made 1st days of November, 1951

Sketched November 24, 1951

Pencil, Indian ink, water-colour on paper.

Printed verso: "Troy State Teachers College presents Percy Grainger . . . November 7, 1949.

FREE MUSIC COMPONENTS (IG 6/1:1)

PITCH-ARMS (2)

AS ILLUSTRATED IN ABOVE DRAWING "UNTITLED" (PITCH-ARMS).

Fine wooden dowel with revolving washers, clear plastic tube and one ping-pong ball.

Percy Grainger: "Model VIII Nov. 6, 1951." "Ella's idea, ping-pong ball instead of wheel."

Fine wooden dowel. Clear plastic tube with 2 pink silk reels with washers, all revolving on dowel arm. Cardboard oblong box inscribed by Percy Grainger.

Percy Grainger: "Model VII Nov., 1951." "Ella's idea: give up skate wheels on masonite wall and let this box slide up & down between 2 masonite walls (worked very well)."

**SELECTED BIBLIOGRAPHY:**

BALOUGH, Teresa.

*A Complete Catalogue of the Works of Percy Grainger.* Department of Music, University of Western Australia, 1975.

- BALOUGH, Teresa. *A Musical Genius from Australia*. Department of Music, University of Western Australia, 1982.
- BIRD, John *Percy Grainger*. London. Macmillan. 1977.
- BLOCK, René "A la recherche de la musique jaune" in *Écouter Par Les Yeux: Objets et environnements sonores*. ARC, Musée d'art Moderne de la Ville de Paris, 1980. p.15.. (Exhibition du 18 juin au 24 août 1980.)
- BLOCK, René "Die Summe aller Klänge ist grau" in *Für Augen un Ohren: Von der Spieluhr zum akustischen Environment*, Berlin, Akademie der Künst, 1980., pp. 109-113. (Exhibition in der Akademie der Künst 20. Januar bis 2. März 1980.)
- CROSS, Burnet "Grainger Free Music Machine." in *Recorded Sound: Journal of the British Institute of Recorded Sound*, NO. 45-46, January-April 1972. pp. 17-21.. Reprinted in *The Grainger Society Journal*, Vol. 8, No. 1, Spring 1986.
- CROSS, Burnett *Excerpts Concerning Free Music From Percy Grainger's Daybooks 1944-1960*. Transcribed by Burnett Cross. Unpublished., Grainger Museum Collection.
- CROSS, Burnett "The Last Free Music Machine & Free Music Machines Maintenance" in *The Grainger Society Journal*, Vol. 8, No. 1, Spring 1986.
- DOERSCHUK, Robert L. "The Life and Legacy of Leon Theremin." in *Keyboard*, , Vol. 20, No. 2, February 1994. pp. 48-68.
- DORUM, Eileen *Percy Grainger: The Man Behind the Music*. Private publication, 1986.
- DORUM, Ivar C "Grainger's Free Music" in FOREMAN, Lewis (ed)*The Percy Grainger Companion*. London, Thames, 1981. pp. 112-166.
- DREYFUS, Kay *The Farthest North of Humanness*. South Melbourne, Macmillan, 1985.
- DREYFUS, Kay *Music by Percy Aldridge Grainger*. Percy Grainger Music Collection Part One. Catalogue One, Grainger Museum, University of Melbourne , 1978.
- DREYFUS, Kay *Objects, Documents and Pictures to Reflect Upon*. University of Melbourne, University Gallery, 1978. pp. 24-34. (University Gallery Exhibition 27 February to 5 April 1978).
- DREYFUS, Kay *Percy Grainger's Kipling Settings: A Study of the Manuscript Sources*. Music Monograph 3 Department of Music, University of Western Australia, 1980.
- FOREMAN, Lewis (ed) *The Percy Grainger Companion*. London, Thames, 1981.
- GOLDMAN, Richard Franko "Percy Grainger's 'Free Music'." *The Julliard Review*, II, No. 3, Fall, 1955. pp. 37-47. Reprinted in *The Grainger Society Journal*, Vol. 8, No. 1, Spring 1986.
- GRAINGER, Percy. *A Synopsis of Twelve Illustrated Lectures by Percy Grainger: A Commonsense View of all Music*. Australian Broadcasting Commission, December, 1934.

- GRAINGER, Percy "The Impress of Personality on Unwritten Music." in *The Musical Quarterly*, I (1915), pp. 416-435.
- GRAINGER, Percy "Melody versus Rhythm." in *Music News*, issue for 29 Sept. 1933, p. 9.
- GRAINGER, Percy *Free Music* - 6 Dec. 1938 Legend held in Grainger Museum Collections, University of Melbourne,.
- HIGGINS, Dick "Music from the Outside" in BLOCK, René. *The Readymade Boomerang: Certain Relations in 20th Century Art*. Sydney, Biennale of Sydney and Museum of Contemporary Art, 1990, p. 132.
- HURLSTON, David Unpublished Thesis, The University of Melbourne, 1991
- MCCULLOCH, Alan *Encyclopedia of Australian Art*. Volume One A-K. Hawthorn [Vic.], Hutchinson, 1984.
- MELLERS, Wilfred *Percy Grainger*. Oxford, Oxford University Press, 1992.
- The New Grove dictionary of musical instruments*. [Vol.] 2, G to O. Edited by Stanley Sadie, in three volumes, London, Macmillan Press Ltd, 1984.
- STEVENSON, Ronald *Free Music interview with Burnett Cross*. Transcript of Recorded Interview, Hartsdale, New York State, March 1978. Printed in *The Grainger Society Journal*, Vol. 8, No. 1, Spring 1986.
- TAN, Margaret Hee-Leng "Free Music of Percy Grainger" in *Recorded Sound: Journal of the British Institute of Recorded Sound*, NO. 45-46, January-April 1972. pp. 21-38..

#### **SOUND:**

*Free Music Demo's - Burnett Cross/Percy Grainger*. Compillation of Free Music experiments 1950-1952 . Includes analogue and digital realisations of Free Music scores by Leslie Craythorn, Ian Anderson and Barry Conyngham, Faculty of Music, The University of Melbourne, 1978 & 1982. Grainger Museum Sound Archive.

*Full Spectrum: Australian Digital Music* (Includes digital realisations of Percy Grainger's Free Music I & II) Move Records, Carlton South, Australia. LP recording, MS 3027.

*Percy Grainger's Free Music*. Lecture by Burnett Cross. Slides and cassette. Grainger Museum Sound Archive, 1994.

*The Listening Room*. Andrew McLennan interview with Burnett Cross.. The Reed-Box-Tone-Tool. Percy Grainger's essay on the means of producing his music: conversation with Burnett Cross in the Grainger Museum. A.B.C. Radio ,17 July 1988.