



April 2011

Once upon a time in Harlem...

# The incredible hulk

Opened in 1959, the

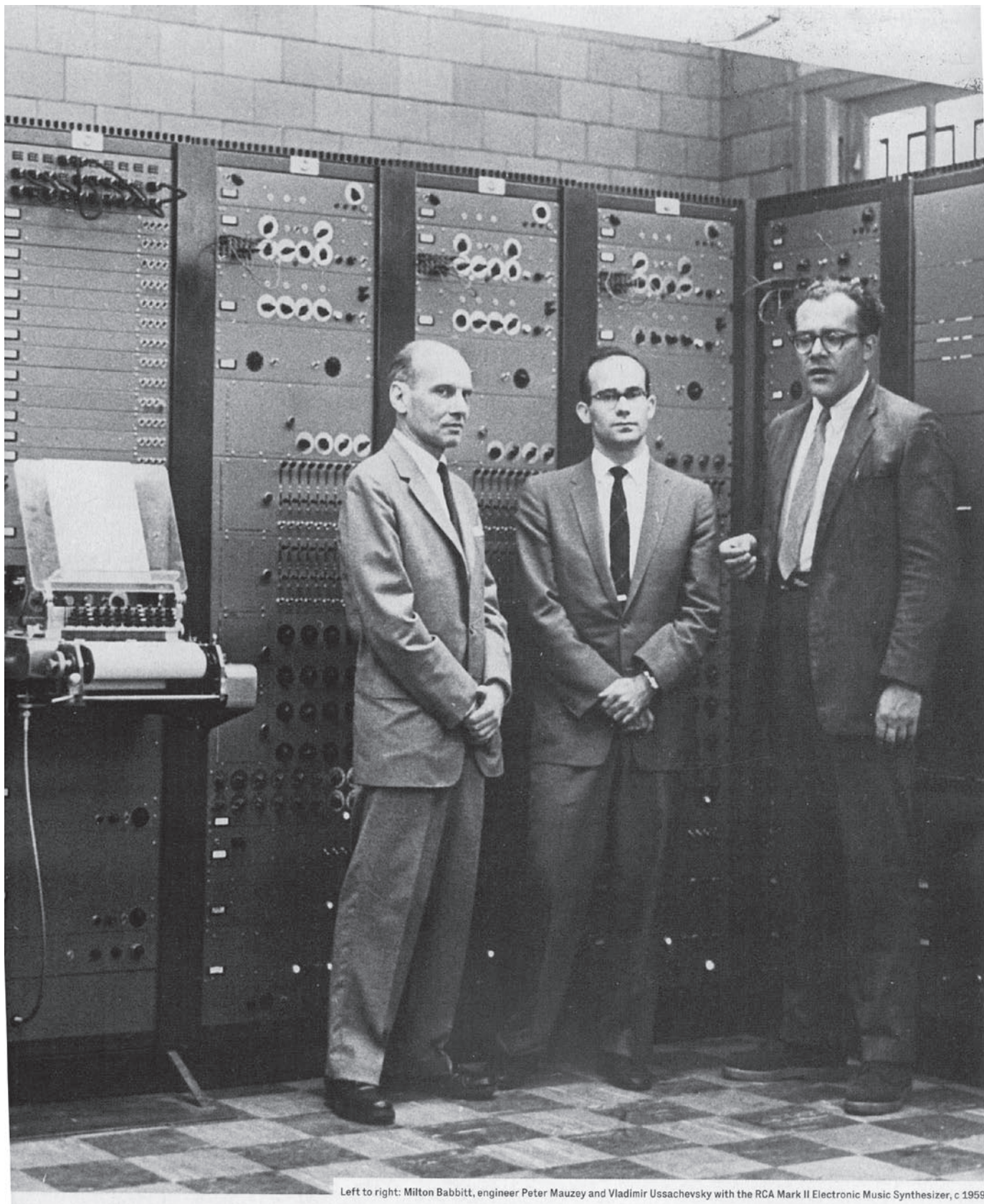
## **Columbia-Princeton Electronic Music Center**

was America's first electronic music studio, a sonic laboratory where composers such as Vladimir Ussachevsky, Otto Luening and Milton Babbitt painstakingly got to grips with gigantic sound processing machines. **Andy Battaglia** scours the ghostly remains of a once vital institution

**On the far west edge** of upper Manhattan, in a spare room rendered by habit in the black and white of history, stands the ghostly hulk of a machine that once rattled and blinked and threw out shapes of waves on an oscilloscope screen. Nothing has flashed or filtered through it for years, but it's monumental still, as tall as a wall and not much less than the two tons it weighed when first put in place. Scrolls of yellowed paper hang from mechanical rollers that used to feed it code by way of holes punched into patterns, like a player piano with the notion of 'piano' excised. Rows of metal switches now rest at attention. Bunches of old patch cords droop. Dials stand dialled down. Knobs the size of saucers hold to groundless positions, unturned for ages but ready, or so it seems, to spin out a strange kind of song.

Now much of it lies under a layer of dust. But 50 years ago, the room-size mass of gleaming metal known as the RCA Mark II Electronic Music Synthesizer was more than all but the most fervent futurist could imagine. After it was installed in 1959, assembled from parts trucked to the city in boxes and ferried to the third floor in a large freight elevator, the futurists there to tend it were led by a cast of distinguished men in suits and ties. Three of them – Vladimir Ussachevsky, Otto Luening and Milton Babbitt – had worked with the synthesizer in the industrial research lab where it was designed, but none could have known what it might be capable of once it was effectively their own.

Together, these three made up a curious sort of mid-century American lot. Ussachevsky was a Russian



Left to right: Milton Babbitt, engineer Peter Mauzey and Vladimir Ussachevsky with the RCA Mark II Electronic Music Synthesizer, c 1959



Otto Luening (left) with Ussachevsky in one of the Center's studios, early 1960s



émigré whose earliest interest in sound developed from listening to the hum of transcontinental telegraph wires on boyhood bicycle rides through the Gobi Desert. Luening grew up with German parents on a farm in the American Midwest, where he started playing with the effects of what he heard by stuffing pillows into a gramophone horn. Babbitt, for his part, was raised in a small town in Mississippi, one of very few Jews in the deep South, and maybe the only one to strike up a simultaneous liking for mathematics and *Finnegans Wake*.

By the late 1950s, these three, already established as composers in New York, had joined forces and focused their efforts on starting up a new centre for electronic music, which was novel enough still to count as not just a new music, but also a whole new medium. A few other studios of the sort were operating in cities across the globe, including Paris, Cologne and Milan. But nothing on such a scale existed outside of radio-supported enterprises in Europe – and none had anything like the behemoth machine that would come to rest in the place where it continues to stand now.

By the time the RCA Synthesizer was delivered in 1959, Ussachevsky, Luening and Babbitt had convinced a number of august institutions to invest in the purely artistic exploration of devices like ring modulators, variable-frequency oscillators and 'white noise' thyatron generators. And so began the Columbia-Princeton Electronic Music Center, which over time would become one of the most important nodes for the development of electronic music in the 20th century. In its prime, the Center operated as a hybrid workshop and laboratory populated by an eccentric mix of characters working with unprecedented methods. Most were musicians or composers forced to become technicians and administrators by dint of what they endeavoured to do.

Others were engineers who wondered what could be musically useful in the weird sounds emitted from the new equipment at their disposal.

The site continues to serve a similar function, as the smaller but still active Computer Music Center at Columbia University. But there could be no mistaking what happens there now for what happened at the beginning, when entire rooms were filled with gear to do what would nowadays be an afterthought on the computers carried around in so many students' backpacks. Reminders from those early years lie around: parts of self-constructed mixers and forged-metal contraptions used to run tangles of tape loops across a room. And although it hasn't even been switched on for more than a decade after an ill-fated photo op involving smoke, the RCA Synthesizer still looms, maybe more formidably futuristic now than it would have been half a century ago.

The story of the Columbia-Princeton Electronic Music Center begins in the boot of Vladimir Ussachevsky's car. Or at least that's where the Ampex tape recorder rode when he and Otto Luening started work together on some of their early compositions for tape in 1952. After hearing Ussachevsky's first demonstration of tape music at Columbia, Luening invited his colleague up to Vermont, where they improvised a number of experiments to be played at a party – Ussachevsky at the controls of the Ampex and Luening with a flute. The results of those experiments led later that same year to a fabled early tape music concert at the Museum of Modern Art in New York, where listeners took in pieces like Ussachevsky's magically expansive *Sonic Contours* and Luening's mysterious *Low Speed* and *Fantasy in Space*. Each is striking still. Over the course of seven severely disorienting minutes, Ussachevsky's piece moves through various sustained

smears of solemn and twinkling piano sounds, as well as hints of nattering alien voices in conversation, all created with splicing and tricks owing to feedback and variable tape speeds. Luening's pieces feature his own flute playing, in the first case slowed way down and in the second layered to simulate a ghostly quartet. The response to the new works was encouraging, as echoed in a favourable review in the *New York Herald Tribune*: "The result is as nothing encountered before. It is the music of fevered dreams, of sensations called back from a dim past."

Their collaboration continued, and by 1955 Ussachevsky and Luening secured a grant from the Rockefeller Foundation, a philanthropic group endowed by the American oil magnate John D Rockefeller, to research the progress of electronic music outside the US. They went on a six-week tour of established studios in Europe, including visits to musique concrète pioneer Pierre Schaeffer in Paris, physicist Werner Meyer-Eppler in Bonn, elektronische Musik proponent Herbert Eimert in Cologne, and Luciano Berio and Bruno Maderna in Milan.

They came back with a host of ideas about how a prospective electronic music studio could and should work in America, starting with a desire to set up something more suitable than their own makeshift workspace in Ussachevsky's living room. As Luening later wrote: "Mrs Ussachevsky had endured the perambulating laboratory without a murmur for years and it was time for a change."

What governed their shared notions for moving ahead was a wide range of experimental approaches to shaping and organising sound, which differed in spirit from some of the more rigorous and strict methodologies advocated by European studios at odds over the theoretical basis of new electronic music. "It was very non-ideological, very open and



very supportive," remembers Mario Davidovsky, an Argentine composer who moved to New York to work at Columbia-Princeton in 1960. "That was very American."

There were also certain pragmatic realities at play. As Luening later told Robert Moog, who himself haunted Columbia-Princeton as an eager young man with an engineering degree, "Most of the European studios were associated with radio stations, but we felt that wouldn't work here because [in America] the forces pushing out work toward commercial exploitation would be too intense. We felt that the correct place was a university, where you have poets, literary and theatre people, and acousticians on whom you can try out all this stuff and get reactions."

Positioning of that sort informed how they would appeal for institutional funding, but it also figured in the range of work that Ussachevsky and Luening favoured. In a detailed report on the field from the late 1950s, in which, for the sake of the Rockefeller Foundation, the context of electronic music was widened to include citations of Chinese court musicians in 2700 BC and Renaissance essayist Francis Bacon imagining proto-sci-fi 'sound houses' in his *New Atlantis* of 1627, the duo wrote, "The augmented world of sound need not move within a strictly musical orbit."

And so it didn't, at least some of the time. Among the many intriguing projects taken on by Ussachevsky and Luening before setting up the Columbia-Princeton Center was a score they wrote for a theatrical production of *King Lear* staged by Orson Welles. After commissioning them in 1956, Luening remembered, "Welles came to the studio to listen to our basic sound materials, which we played for him after his stentorian command: 'Proceed!' After five minutes' listening, Welles, who has an extremely musical ear, said, 'This is the greatest thing to have happened in the theatre since the invention of incandescent lights'." Certain sounds used in the score also wound up in a separate Ussachevsky composition from 1956 called *A Piece For Tape Recorder*, which draws on deeply abstracted sounds from sources including a gong, a kettledrum, an oscillator and the noise of a jet plane.

Orson Welles was no marginal figure at the time, which meant that the weird realm of tape music had gained something of an audience in New York. Or at least, enough awareness to let Ussachevsky and Luening think big, as they did after gaining access to a new experimental synthesizer being developed at a research centre at RCA Laboratories in nearby New Jersey. It was there that they met fellow composer Milton Babbitt, who was working at Princeton University and had no shortage of ideas, musical and otherwise, of his own.

"The present plans of RCA seem to be to prepare... this versatile research tool for the routine task of synthesizing popular music in the RCA Victor division. This is a deplorable waste." So reads an uncharacteristically undiplomatic passage in a 1950s grant report by Ussachevsky and Luening. Perhaps they had fallen under the pointed sway of Babbitt, who was even less charitable about some of RCA's early aims for its synthesizer. (In an interview much later, Babbitt assessed *The Sounds And Music Of The RCA Synthesizer*, a 1955 LP made up of things like a schmalzty synthesized take on "Blue Skies"

by Irving Berlin, as "one of the silliest records ever heard by anybody".)

When they were invited to work with the new machine in 1957, Ussachevsky, Luening and Babbitt had more than simulacra of pop tunes in mind. Babbitt was especially enthralled, as the synthesizer seemed to suggest the possibility of precise and meticulous music unencumbered by the limitations of earthly performers. As he wrote in a paper for *The Journal Of Music Theory*, "The constant self-question of the composer of the past: 'Does what I have written exceed the capacities of the performer?' is now replaced by: 'Does what I have produced exceed the perceptual capacities of the trained listener?'"

Alongside the question of what to compose for the synthesizer was the matter of how to get it within the reach of composers of 'art music'. Estimates for the cost of a new synthesizer at the time were around \$250,000 (the equivalent of about \$2 million today), but RCA had expressed interest in effectively handing over the original if the likes of Ussachevsky, Luening and Babbitt could take it on. To that end, they went back to the Rockefeller Foundation, which had funded a smaller studio concern at Columbia already. Part of their appeal leaned on the need in America for means of unmediated aesthetic research. From a report to the foundation: "Attitudes now existing in film, radio and television do not favour development in the United States of the special experimental studios increasingly found in Europe as adjuncts to the conventional technical broadcasting set-up... So much needs to be done in the purely abstract musical field that the interested students and mature composers, who, as a majority do not work by commercial motivation alone, must be given the facilities which are independent of immediate commercial gain."

It worked. The foundation ended up giving a five-year \$175,000 grant to move the RCA Synthesizer and start up a shared Columbia-Princeton Electronic Music Center in sufficient space in an old milk-processing building on West 125th Street, a short bus ride from the Columbia campus on the industrial outskirts of Harlem. The building belonged to the electrical engineering department of Columbia, but a few rooms on the third floor would become home to a very different kind of enterprise.

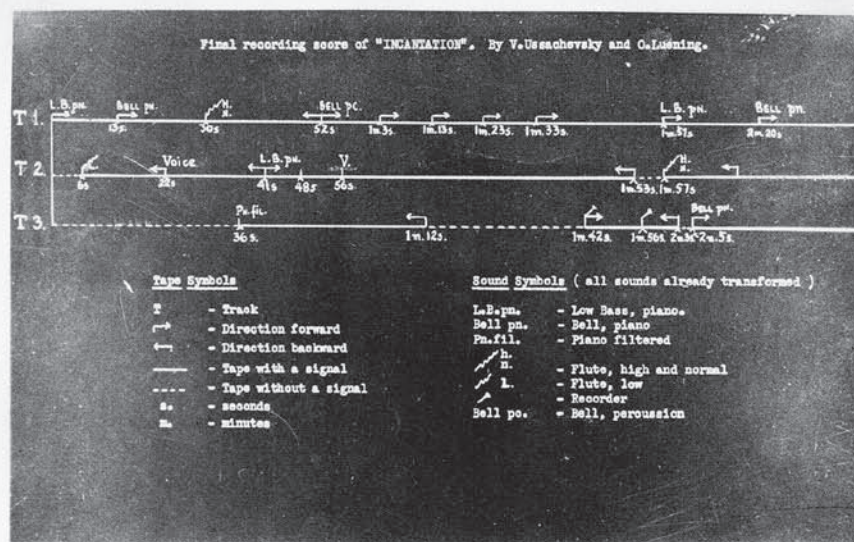
The job of setting it all up was led by an engineer for the Columbia music department named Peter Mauzey, who was an engineer through and through. Behold his less than stirring attempt to define a certain term of art for a paper he wrote about some of his early equipment modifications: "Music consists of a pleasing, expressive or intelligible combination of tones." What he might have lacked as an aesthete, however, was more than made up for by his visionary approach to the machines he reached into. It was Mauzey, in the early 50s, who first introduced Ussachevsky to quirks he had discovered in the school's first Ampex tape recorder. "We were able to add reverberation by mixing the output with the input, and it produced interesting sounds which we were listening to ourselves just out of curiosity," Mauzey remembers now. "I didn't realise at the time that it would be of any particular interest to musicians."

But it was, of course; so much so that by 1959 Mauzey was tasked with making sense of the far more elaborate Mark II synthesizer. James Seawright, another staff engineer who worked on the synthesizer



"Hi-fi with a vengeance": Vladimir Ussachevsky adjusts a tape loop



Score of Ussachevsky & Luening's *Incantation* for tape recorder (1953)

in its early years, remembers, "I had seen equipment that looked somewhat like it, but on a navy ship. The sheer extent of it was impressive. It required a very high degree of discipline. If you made the mistake of trying to run the paper tape backwards, you could create a situation where you had to spend 12 hours straightening out little metal brushes. It was not a machine that was capable of withstanding anything but the most painstaking work."

The musician most eager to do that work was Babbitt, who took to the Mark II to compose important early pieces like *Composition For Synthesizer* in 1961, and *Philomel*, a major work from 1964, based on a Greek myth, that mingles alternately steely and ethereal tones from the synthesizer with a soprano singing the role of a woman whose tongue was cut out by a king who defiled her, and who later transformed into a bird. Operationally, the Mark II lent itself well to Babbitt's mathematical mode of composition. The way it worked, by processing code from holes arranged on the scrolls of paper tape, was akin to typing: the composer would sit and punch out arrangements on an array of 40 keys, and the machine would read the instructions by way of metal brushes sweeping for holes, allowing for newly exacting degrees of precision in terms of rhythm and sound.

The word 'tedious' comes up a great deal in accounts of what the process was really like. As Babbitt once said, "When everything is going right, when I know exactly what I want and the equipment is working properly, and if I'm lucky, I can get one minute of music out of six or seven hours with the machine. Most times it takes much longer."

One of the ironies of the Mark II is that, for all its grandeur and all the prestige it lent to Columbia-Princeton in the early years, Babbitt was one of the few composers at the Center to actually use it. Davidovsky, who was introduced to Babbitt after expressing an interest in electronic music with the American composer Aaron Copland, remembers, laughingly, the first time he saw the synthesizer after arriving in New York from Buenos Aires: "My English was kind

of flaky, and Babbitt, with his brilliant virtuosity for lecturing, was not for me all that easy to follow. I saw this machine with red lights and toggle switches and all kinds of code-reading inputs, and for the first time I thought, 'What I am doing here?' I was so overwhelmed I almost wanted to go back home."

Maintenance was a source of vexation too. Mixed in with records of triumph in the archives at the Center now are piles of papers detailing all kinds of blunders and malfunctions. A long letter to RCA from late 1960 catalogues harrowing tales of mechanisms misbehaving and the machine wrongly eating paper scrolls that had taken months to prepare: "Events and results of what has been for us – in many important respects – an enlightening, frustrating and disappointing 15 months."

Tacked on at the end of another letter to a composer about rescheduling studio time is what reads like a sort of wry aside from Ussachevsky, a man who had clearly weathered such matters before: "The trouble with the synthesizer is fixed. It was not altogether a routine breakdown."

Happenings at Columbia-Princeton were followed closely from the start, thanks in part to curiosity over the novel Mark II. But the Center's true coming-out came by way of a pair of concerts spread over two successive nights at Columbia's McMillin Theatre (now called Miller Theatre) in 1961. The set-up at the concert hall was crucial to the presentation of new electronic music in America, with 19 speakers controlled by a flexible mixer custom-built by Mauzey. The programme notes took care to mention that, with the exception of one piece to be broadcast from the stage, "all the other compositions make use of speakers encircling the audience".

Before the programme began, Columbia provost Jacques Barzun took the stage to address an audience not necessarily all versed in electronic music. "Most of you no doubt are convinced and converted," went his opening remarks, "but there may be some of you who have come in trepidation and a mood of



resistance. This is the Age of Anxiety, and you may wonder – is it music?” After asserting that “we are not here to dislike or to disapprove but to understand”, he went on to talk about the notorious 1913 premiere of Igor Stravinsky’s *Le Sacre Du Printemps*, and all the jeers and confusion that greeted it. “Nowadays the young,” Barzun noted, “take *Sacre Du Printemps* as if it were a lullaby, and indeed they hear it at the circus where the elephants dance to it. So our associations, our assumptions, our expectations rule not only our judgments but our sensations, and they change with time so that electronic music may yet be the heavenly music of the future.”

With that, the programme turned to new works composed at the Columbia-Princeton Center. As Davidovsky remembers, “It was totally mobbed, a very good event. Visually it was not ideal, with people sitting as if in straitjackets looking at a stage populated with three or four wobbly black boxes. But what it made possible was to present to a large audience electronic music played back the way it should be played back, with accomplished equipment. It was of tremendous educational importance because of the polyphony of the multi-channel sound we had available. People at that time didn’t have nearly anything like it.”

A rapturous review in the *New York Times* called it “hi-fi with a vengeance”, and relished the whole programme’s newness. “Strictly speaking,” wrote Harold C Schonberg, “when confronted with so new and unprecedented a medium, the listener should have about the same opinion of it as he has about Einstein’s Unified Field Theory – great respect mingled with total incomprehension.” The critic from the *Herald Tribune* was less enthused, describing some of the sounds as “reminiscent of a dentist’s drill or a banging radiator. Most of the pieces sustained attention, for they were mercifully brief. Yes, they were interesting. So what?”

And then there was this, in an unsigned note addressed to the ‘gentlemen’ of the Center from someone who had been in the audience: “Why, oh why don’t you, dear sirs, transfer to the Department of Electronics or Engineering where perhaps your efforts there might benefit country and industry? For you are mad, indeed, to think that you have a part to play in the Department of Music. As for further ‘concerts’... Well!!!!!!”

Babbitt, for his part, was pleased to have his *Composition For Synthesizer* presented with nothing on the stage to serve as a distraction. “For the first time,” he told a reporter, “the audience really has to listen.” It fitted into his conception for what was most liberating about the process of making electronic music. “It must be emphasized,” he wrote in a paper published the year before, “that to speak of the ‘performance’ of electronic music is meaningless: performance and composition are here an indissoluble act: one may as justifiably speak of the ‘performance’ of a painting.”

Babbitt’s piece marked a major step up for work produced on the Mark II, but the rest of the programme drew primarily from compositions devised in one of the Columbia-Princeton Center’s other studios set up for more tape-intensive processes in smaller rooms near the main hub. That’s where most of the action happened, as an increasingly diverse cast of composers descended on the Center throughout the 60s and early 70s to visit and work. Edgard Varèse

was a regular in the early years, during which time he worked on revisions to parts of his composition *Déserts*, and the list of notables to spend significant time there includes Wendy Carlos, Robert Moog and Charles Dodge. Also among them were an international coterie including early staff members Bülent Aral and İlhan Mimaroglu from Turkey, Davidovsky from Argentina, Halim El-Dabh from Egypt, and numerous others from locales including Japan, Spain, Israel, Yugoslavia, Peru, Brazil and Venezuela.

Much of that worldliness owed to Ussachevsky, remembered by those who worked with him as an inveterate traveller and a magnanimous opportunity-maker open to anyone with serious interest. Part of it was also down to the Center’s stated goal to court diversity in terms of style and approach. From a “Progress Report” issued by the Center in 1963: “The laissez-faire attitude of the studio is deliberately contrary to the European practice of imposing doctrines upon composers affiliated with a studio and justifying this practice with elaborate ‘rationalization.’”

That didn’t mean channels were cut off between Columbia-Princeton and similar centres in Europe, however. Luciano Berio did studio work there, and Karlheinz Stockhausen visited from Cologne. (Asked if he remembered Stockhausen’s impression of the place, engineer Seawright laughed: “You didn’t talk to Stockhausen like that. You produced information for him.”)

More than 50 years after it opened, much of the history of the Columbia-Princeton Electronic Music Center is now stuffed into a dusty closet room filled with creaky metal file cabinets and shelves of brittle tape reels spilling on top of boxes filled with ephemera. Broken Rolodexes include address cards for the likes of Marcel Duchamp, Pierre Henry, “Mrs Arnold (Gertrude) Schoenberg c/o Luigi Nono”, Morton Subotnick. In a drawer packed with early 60s issues of *Scientific American* is Milton Babbitt’s wallet, a floppy old leather thing left in a desk and still holding his membership card for the Audio Engineering Society in 1965. Fading sales brochures hawk old Ampex tape recorders and the hottest new things in transistors and vacuum tubes.

Folded within are invoices, memos, written appeals for badly needed air-conditioning repair (in February), engineering schematics, pencil sketches for modifications to tape machines – a ramshackle record of the Columbia-Princeton Electronic Music Center as a teeming operation whose workaday existence called on far more than just resourceful appeals for the greater good of abstract sound.

The files were organised in large part by Pril Smiley and Alice Shields, both of whom played important roles at the Center as composers and administrators starting in the early 60s (at a time when women in such positions stood to be described, as in a *New York Times* article about the centre’s tenth anniversary, as “two pretty 26-year-old girls – brunette Alice Shields and blonde Pril Smiley”). The archives are looked after now by Brad Garton and Terry Pender, directors of the Center in its current form. Students still walk the hallways, and strange sounds trail out of a few small music studios still in use. But it’s hard, sitting in that old closet room, not to feel haunted by ghosts. They’re all over the building. Much like in the beginning, the





He cares if you listen: Babbitt at work on the RCA Mark II Synthesizer, 1972

repurposed old milk plant stands nominally in Harlem, but more so in a remote industrial netherzone sapped of any signs of culture. The most vital locus of activity now is an over-bright McDonald's built in recent years down the street beneath a train trestle, and it's a few blocks' walk from there to the more normal city bustle outside a giant public housing-project complex, completed in 1956 and named after the Civil War general Ulysses S Grant.

The building itself brims with legends of strange activity from before and after the music centre was established. Those who spent time there remember lots of closed doors and security guards stationed at conspicuous points on different floors. Work related to the Manhattan Project during World War Two may or may not have gone on there, in conjunction with Columbia's engineering department. Certain kinds of nuclear research seem to have transpired later in the basement under the watch of a heat-transfer lab only recently dismantled. For at least a few years near the music centre's start, part of the building was shared with an enterprise called Riverside Research, known for its varied work in fields including radar, optics, and bio-engineering. Puzzlingly, for reasons that remain elusive, the inside of a circuit breaker board outside the room where the Mark II stands is labelled, still,

with a faded sticker for a 'vivarium' and another for 'maternity room + surgery ceiling lights'.

Verifiable details for some of the above are hard to come by, but tales of mid-century mystery persist. Everybody talks about them, even after the last vestiges of any such operations left a few years ago and made room instead for studio space for Columbia's art school. What is definitely verifiable, and easy to come by still, is much of the music made at the Columbia-Princeton Center at a time when the ideas and processes of electronic music were only just starting to coalesce. Few centres anywhere could compare to Columbia-Princeton in its prime, before the advent of modular synthesizers in the late 60s made the prospect of electronic music studios more mobile and digital computer music started to take over later from its analogue antecedents. Many trace the end of the original centre's reign to 1976, when vandals broke into the building and wrecked much of the equipment still in use, including parts of the ever more anachronistic Mark II.

The three principals of the Columbia-Princeton project are all gone. Ussachevsky died in 1990, Luening in 1996, and Babbitt, the last to go, in January of this year. But their music lives on, as does the lingering effect of all the work that went on behind

it. Tucked into one of many file folders hidden away on West 125th Street and waiting to be found again is a piece of writing by Ussachevsky titled "Random Thoughts On Creative Collaboration With Machines". In language marked by his distinctive mix of both process-minded pragmatism and wild-eyed wonder, he muses over what it felt like to be in the throes of a new compositional process, and a new kind of bond with technology, that he did so much to engender. An excerpt, to be cut or spliced as best seen fit: "All then seemed possible: one leaned on the horizon and pushed it away and forward until utter exhaustion would set in and, one by one, the nerve endings ceased to connect, the possibilities contracted, and an automatic reversal to routine solutions was a sure danger signal to quit. An affectionate pat on a control here and there was not to be resisted. Switches and lights off! If there is an unfinished bit of conversation between you and the machines, either take note of all the controls or leave them alone until tomorrow. Recapturing the exact circumstance of such periods as just described is not easy. Tomorrow it may seem all cold steel, copper and coloured plastic. The coaxing may have to start all over again." □ The Unsound Festival in New York includes a tour of the Center site on 2 April: see Out There