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Manfred Clynes Sees A Pattern in Love -- He's Got the Printouts

His Machine Shows Emotions Have Measurable Shapes That Can Be Reproduced

by Timothy K. Smith, Staff Reporter

NEW YORK -- When a man with a unique beard announces that Beethoven's last quartets are actually storage devices for noble emotions -- emotions that he can now reproduce with an Apple computer -- some sort of background check is in order.

Now then: Who is Professor Manfred Clynes, and what are his scientific credentials?

Prof. Clynes, an esteemed neuroscientist, formulated the basic biological law that explains, among other things, why it is impossible to smell the fading of an odor. He also invented the machine that was for many years the standard laboratory device for measuring brain waves.

Fair enough. And his musical credentials?

Prof. Clynes has performed piano recitals to great acclaim on three continents. He studies with Pablo Casals. Sir Yehudi Menuhin, the violin virtuoso, calls him a friend and "a brilliant musician".

Well. And his literary credentials?

Prof. Clynes is a published poet and the author of five books. He coined the word "cyborg". He also coined the word "sentics" to describe a new science entirely of his own devising.

Anything else? A fan letter from Albert Einstein maybe?

"Your art combines a clear understanding of the inner structure of the music with a rare spontaneity of expression. . . . I am convinced that you will meet with the understanding to which your achievement entitles you," Einstein wrote to Prof. Clynes in 1953, after hearing him perform a program of Mozart, Beethoven, and Schubert.

Why have so few people heard of so eminent a polymath as Manfred Clynes? For one thing, the 66-year-old scientist has spent the past 12 years in Australia. For another, "He's working on things that are so far out that people don't follow up on them much. it's time that more people looked into them," says Marvin Minsky, the Harvard scholar and dean of artificial-intelligence research.

Prof. Clynes proposes that when human emotions are expressed, they have shapes -- real ones, shapes he has measured with a machine, the same from one person to the next, as recognizable (and reproducible) in a painting, a gesture or a song as in a frown. His proposition is so embarrassing to traditional scientists that when he first presented a paper on the topic, at a

conference in 1968, the audience laughed out loud.

But he has been refining his theory ever since, and influential thinkers are taking notice. "I think artificial intelligence isn't going to approach human capability until it understands that emotions aren't really separate things, but different kinds of knowledge," says Prof. Minsky. "That's one of the reasons the field is stuck."

Perhaps, some day, Prof. Clynes's work will enable computers to feel, and then we will have a few words with them. But his theory actually has far more immediate implications. If he is right, it should be possible to experience a new kind of laughter. It should be possible to sit down with a musical score and an unfeeling computer and synthesize a performance of Beethoven that is as Beethoven meant it to be played. All these Prof. Clynes says he has done.

The music Prof. Clynes has produced is still recognizable as synthetic -- synthesizers aren't yet up to producing sounds absolutely faithful to instruments. But it is also recognizably moving. "I threaten my students with it," says Robert Abramson, a professor of music at New York's Julliard School. "I say, 'This is what a computer can do. Can you do better?'" And Prof. Clynes's music is, as much as anything, a demonstration of his ideas about the brain -- a logical approach, as music contains a much richer vocabulary than words do for conveying emotions.

The root of Prof. Clynes's theory goes back to his boyhood in Vienna, where his father designed paddle-wheelers that steamed the Danube, his mother wrote plays and studied physics, and his maternal grandfather invented the soda siphon. "When I was a child, I used to listen to Casals playing Schubert trios" on records, Prof. Clynes says. "I used to have these wonderful moments of ecstasy that seemed tremendously important. And I assumed that other people had them all the time only much later I found out that wasn't the case."

His family migrated to Australia in 1938, and there Prof. Clynes studied music, engineering, physics, and mathematics. Eventually his path led him to the biocybernetics research laboratories at Rockland State Hospital in Orangeburg, New York, where he took some transistors and a tape recorder and built the first Computer of Average Transients for measuring human brain waves.

After hooking up his invention to the scalps of many volunteers, Prof. Clynes made a startling discovery: Different people's brains respond in the same, orderly, predictable way when stimulated by the color red. Prof. Clynes began to wonder whether the process could be reversed -- that is, whether inner states would register uniformly when different people were hooked up to an output device. So he built another machine, an exquisitely sensitive instrument for measuring the pressure applied by a fingertip, which he called a sentograph.

Casting about for a way to test his hypothesis, he remembered the observation by German musicologist that experienced musicians, when asked to wave a finger to "conduct" pieces by different composers, tended to produce patterns, or shapes, that were characteristic for each composer. He hooked himself up to his sentograph and thought his way through pieces by Beethoven, Mozart, and Schubert, and made clearly different shapes for each composer. Were they just his own shapes? Or were they somehow absolute?

Here Prof. Clynes's research almost went off a cliff, because the next person he hooked up to the sentograph was the pianist Rudolf Serkin, who turned out to be a wise guy. "We asked him to

think Beethoven, and he would think Mozart," Prof. Clynes says. "But we could tell by looking at the printout. So he cooperated, and we got the same shapes. That was probably the most exciting moment of my life."

Prof. Clynes verified his findings using the fingers of Pablo Casals and other accomplished musicians, and was able to derive shapes representing the "inner pulses" of different composers -- not unlike the brush strokes of different artists. He concluded from this that touch expression and musical expression have the same origin in brain function. Could it be, he wondered next, that emotions themselves were similarly hard-wired, as firmly rooted in physiological reality as is the genetic code?

He hooked up his sentograph up to hundreds of subjects, recording the patterns they made when asked to use finger pressure to express anger, lust, hate, joy, reverence, and other conjured emotions. He took the machine -- a preindustrial-looking thing in a wooden box -- to Mexico, Japan and Bali to factor out cultural bias. The shapes of emotions, which he called "essentic forms", were the same wherever he went. The experience of a given emotion and its expression, he concluded, were an indivisible unit, programmed in the brain. That explained why emotional communication was so often unambiguous: why children cringe at scowls, why Michelangelo's Pieta evokes grief, why the whole world knew what Khrushchev meant when he banged on a desk with his shoe.

It might also explain why some music is great and other music is not great -- why, in Prof. Clynes words, "anyone who has heard Beethoven's last quartets tends to become stronger." First he discovered mathematical parameters for the "inner pulses" of various composers, and then he set to work programming a computer. He used the program to manipulate phrases, amplitudes, individual note shapes and infinitesimal pauses, looking for essentic forms in music that would give maximum satisfaction to the brain -- the kind of satisfaction that his own young brain had experienced listening to Casals.

Lest this seem like labor that only a wonk could love, Prof. Clynes quickly points out that it still depends on a programmer's artistry. Overcoming the tyranny of technique, it allows a musician to refine a performance outside of time -- to stop, back up and fix phrases at a unprecedented level of detail, working like a sculptor toward a more perfect sonata.

There are skeptics. "We will never have great performances coming through that route," says Yehudi Menuhin. "It's like using a thermometer. It tells you something about what's going on, but it doesn't cure anything."

And there are believers. "We have taught (musicians) to read the notes, but not the music," says Julliard's Prof. Abramson. "What comes out is a simulacrum of music, without any of the meaning. (Prof. Clynes) is showing people that there are ways of actually transmitting emotions in music. But this is stuff that nobody can talk about."

Prof. Clynes has obtained patents on his computer program and set up a company called Microsound International Ltd. in Sonoma, California, to refine it.

About that new form of laughter: Try putting your middle finger on a flat surface, setting up an internal giggle and preventing your throat from moving. Now press down with your finger, about five beats per second. If you get it right, it can be hard to stop.

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