

“Machine stitched into  
a corner of the Canadian  
modern age flag”

Glenn Howarth's Telidon Art

John Durno

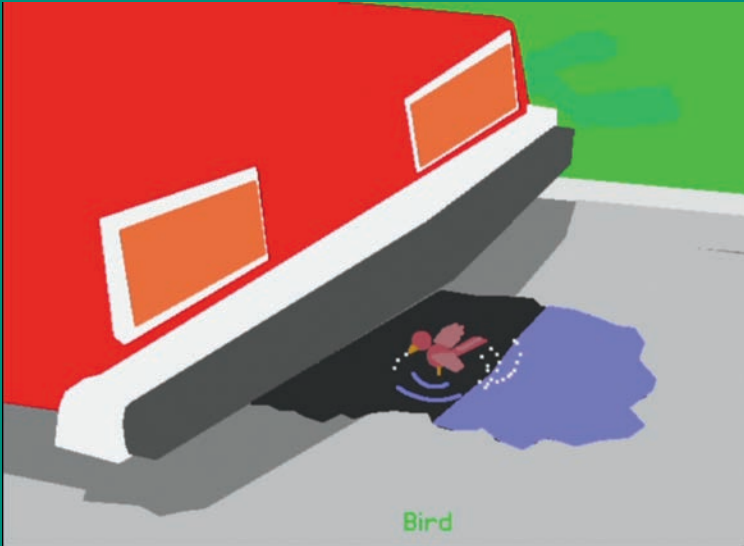




“Starfish3,” an example of  
Howarth’s Telidon art.

[Glenn Howarth fonds, AR465,  
University of Victoria Libraries Special  
Collections and University Archives.

Image courtesy of John Durno.]



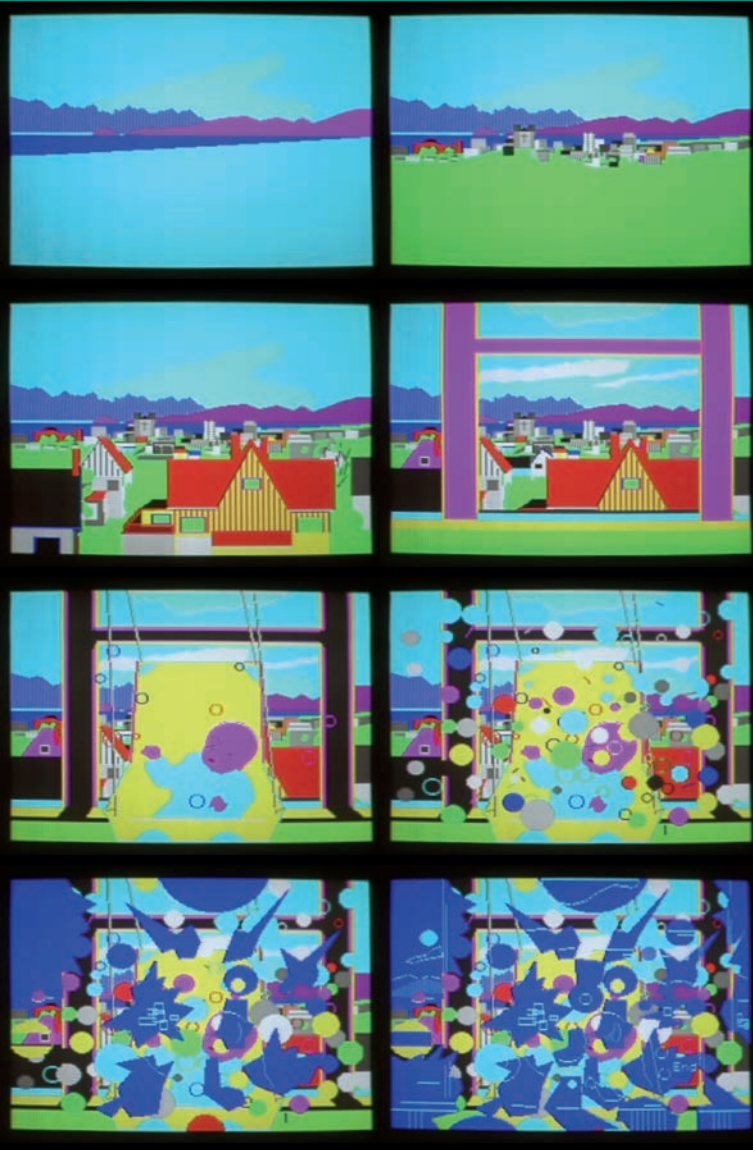


When Victoria artist Glenn Howarth passed away in 2009 at the age of 62, he left behind a wealth of archival material. The youngest person ever admitted to the Royal Canadian Academy of the Arts (RCA) when elected in 1978, Howarth was a prominent visual artist and revered teacher who created a large body of work in media both traditional and new during his lifetime. A substantial donation of his archival material to the University of Victoria Libraries Special Collections and University Archives in 2012 reflects the range of his work. The Glenn Howarth fonds (AR465, accession number 2012-005) includes ten boxes (3.4 metres) of sketchbooks, criticism, diaries, fiction, letters, video recordings, ephemera, and digital art, the latter consisting of hundreds of computer files on 5.25- and 8-inch floppy disks. These disks hold the innovative digital art that Howarth produced in the 1980s using a Canadian videotex technology called Telidon. The story of Howarth's Telidon art is a story of a medium embraced and then abandoned, of artworks lost and found. This story, the subject of this essay, encompasses the recovery of uniquely Canadian digital artworks so deeply enmeshed in an obscure and long-obsolete technology that they, along with the works of dozens of other Telidon artists, were in danger of being altogether forgotten.<sup>1</sup>

1 For example, see Hank Bull, "DictatiOn: A Canadian Perspective on the History of Telematic Art," in *Social Media Archaeology and Poetics*, ed. Judy Malloy (Cambridge, MA: MIT Press, 2016). Telidon is not mentioned.

"Bird," an example of  
Howarth's Telidon art.

[Glenn Howarth fonds, AR465,  
University of Victoria Libraries Special  
Collections and University Archives.  
Image courtesy of John Durno.]



Digital art was something of an anomaly in Howarth's oeuvre. In the early 1970s he worked as a critic, writing art reviews for local newspapers, but by the mid-1970s he had turned to painting, winning national acclaim for a series of psychologically charged, bravura oil paintings. He was a fast-rising star in the Canadian art world, with a succession of shows in prestigious public and commercial galleries behind him that culminated in his election to the RCA. At the end of the decade, however, he ran into difficulties. He was no longer able to finish paintings to his own exacting standard, and his work was not selling well. He got by through teaching, working as a sessional art instructor at the University of Victoria, the Banff School of Fine Arts, and elsewhere.

Howarth re-emerged as a digital artist in the early 1980s. At the apex of this phase of his career, he represented Canada in the 1983 Bial de São Paulo, both curating and participating in an exhibition of eleven Canadian digital artists working with Telidon. By the middle of the decade, though, he had grown disillusioned with digital media, and he spent the rest of his career working in paint, graphite, and charcoal. As the years went by, his pioneering digital artwork was all but forgotten; biographical sketches written in later years often omitted any mention of it. Even among those familiar with Howarth's work, not much more is generally known of his involvement with digital art than the foregoing minimalistic account. The reasons for his sudden, near-total immersion in digital art-making—and ultimate abandonment of it a few years later—remain obscure. These details emerge only as we examine the artist's letters and other documents in the Howarth fonds.

A sequence of images created by Howarth using Telidon. The images depict the view from Howarth's apartment, beginning with an illustration of the ocean at Dallas Road in the background and introducing more detail in the foreground in each frame: first buildings, then the window frame, then Howarth's baby daughter, and, finally, abstract shapes that cover the scene. [Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives. Images courtesy of John Durno.]

~~Telidon is an idea.~~

" At the University of Victoria in Canada where I teach, two colleagues introduced ~~to~~ <sup>to</sup> me a computer graphics system that captured my imagination.

Dr. David Godfrey and Dr. C. Chang programmed the Apple II micro-computer to make Telidon pictures. I know nothing about computers, nothing about the Telidon language of encoding graphic information; I understood pictures; ~~and that~~ <sup>was painting</sup> I had discovered the electric paint brush I had dreamed of. Using oil paint for eight years, I had become well known and highly skilled; ~~so~~ I painted ~~more~~ slowly and carefully. A single picture required many weeks of work ~~and~~ with the computer shapes appeared instantly. My best Telidon picture required only four and one half hours of work. With Telidon and the Apple Computer it was possible to ~~think~~ make shape as fast as I could think. While I have always loved pictures, and once loved painting, I now again began



# “A National Requirement”: Howarth’s Introduction to Telidon

It was during a sessional teaching appointment at the University of Victoria in the summer of 1981 that Howarth first encountered Telidon, the technology that would become the focus of his creative energies for the next four years. One of his students invited him to a demonstration of a “new Apple based Telidon computer graphics system,”<sup>2</sup> developed by a team led by Dr. Ernest Chang, a faculty member in the university’s computer science department. Impressed with what he saw, Howarth sensed an opportunity. “I knew that the developers of this computer graphics system would need an artist, someone from their own world, for legitimacy,” he later wrote: “what I did not understand at the time, was that the technology was Canadian to the extent, like the Candu reactor, that the word Telidon was machine stitched into a corner of the Canadian modern age flag; and that the need for the legitimacy a trained artist could provide was a national requirement.”<sup>3</sup>

2 Glenn Howarth to Catharine [computer file], 11 October 1984, box 10, folder 8, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives. (Editor’s note: Spelling and punctuation errors in quoted material from the fonds have remained uncorrected to preserve Howarth’s voice.)

3 Howarth to Catharine, 11 October 1984.

to enjoy making pictures again. Working in the computer laboratory with two programmers, I am very content as I was in the first five years of studio painting. The programmers whose creativity I respect, tap gently on their keyboards. My machine makes beeping noises and often I laugh each time I ~~make a discovery~~ ~~or~~ something unexpected.

The apple computer is like a small sports car which I drive. ~~at first, very exciting.~~ If my mood is good ~~except~~ the machine is, an extension of my deepest thoughts but if I wish to be elsewhere or I am distracted, nothing works, my editing buffers overload, the system crashes, and I loose <sup>lose</sup> pictures. ~~I did not want~~ my heart did not want to make. (Very much like my car which when I want to stay home, refuses to start.) As a machine the computer is a tool, and like a craftsman's tools, does fine work only when the artist loves his task. The machine is, an extension

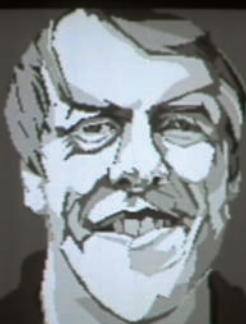
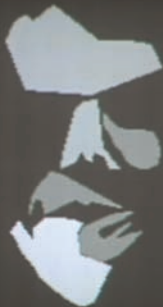
While Howarth's observations may seem curiously hyperbolic now, they would not have read that way in the early 1980s. Telidon is not much remembered today, but in its time it was an object of national pride and international interest. Formally announced in 1978, Telidon began as a federally funded project to build interactive computer networks on a national scale. Although similar systems, generically called "videotex," were being developed in other countries around the same time, the Canadian technology was capable of displaying far more sophisticated graphics than its chunky, bitmapped competitors. For a time, it seemed possible the Canadian-made technology might become the dominant standard in the international videotex space, asserting Canada's role as a major player in the new high-tech arena.

As we now know, that was not to be. For a variety of reasons, including the high cost of the hardware required to create and display its dearth of compelling content, Telidon never gained the widespread uptake necessary to achieve success in the commercial marketplace. Following a series of field trials and experimental deployments in the first half of the 1980s, and its eventual emergence as an international standard in 1983, the project was officially cancelled in March 1985, its funding terminated by the recently elected Mulroney government.

However, during its brief heyday Telidon attracted broad interest across the Canadian cultural sector. Despite the centralized nature of the information utilities that were officially envisioned as content providers for the networks, a variety of writers, educators, artists, technologists, and others saw a potential in Telidon to democratize expression through community access to a new, high-tech channel for publication and interactive communication. Some of that early idealism is visible in Howarth's writings:

PORTRAIT OF  
THE ARTIST'S  
SPONSOR

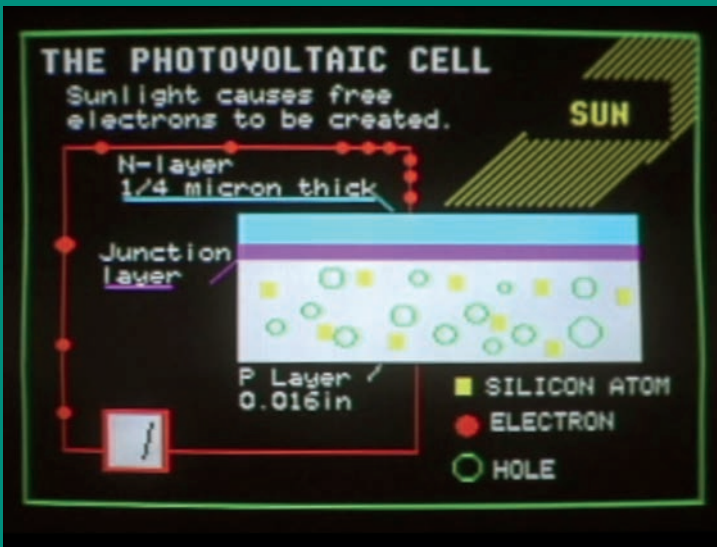
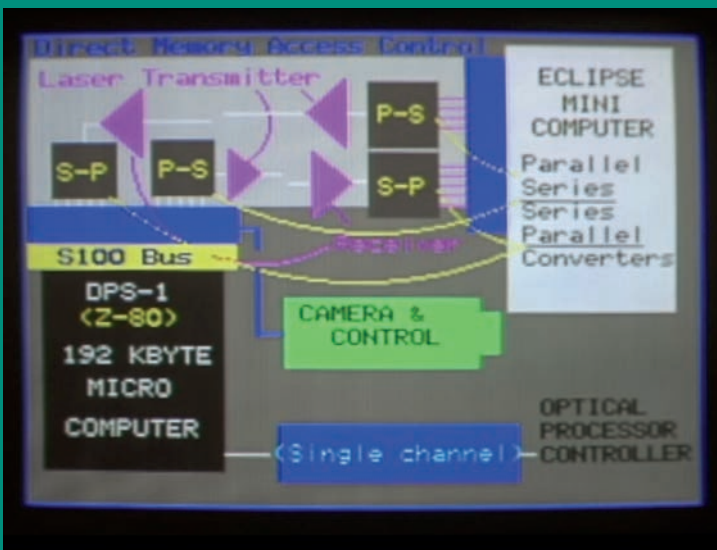
DAVE GODFREY



As microcomputers proliferate, more artists will become involved, and the immense power of computer technology will be in the service of the imagination. The computer can be used for political control, and it can be used to strengthen and liberate the human spirit. Humanism + the creative imagination must struggle to appropriate computer technology.<sup>4</sup>

Howarth made the transition to computer graphics under the sponsorship of Dr. David Godfrey and Dr. Ernest Chang, both faculty members at the University of Victoria. Godfrey, whose varied and impressive career had by the late 1970s traversed writing (*The New Ancestors*, winner of the Governor General's award in 1970), publishing (co-founder, House of Anansi Press; founder, Press Porcepic), and academia (dean, Department of Creative Writing at the University of Victoria), was a major proponent of Telidon in those years. In the early 1980s Godfrey moved into high tech as the principal and founder of Softwords, a company focused on computer-aided learning. Following the publication of *Gutenberg Two* (1979), a widely influential collection of essays on the cultural impacts of computer networks that he edited with Douglas Parkhill, Godfrey published and co-edited *The Telidon Book* (1981) with Ernest Chang, who, as noted above, developed the Telidon computer graphics system that Howarth first saw in the summer of

4 Glenn Howarth, untitled draft beginning "At the University ...," n.d., box 3, folder 15, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.



1981. Without Godfrey and Chang's sponsorship, it is unlikely that Howarth could have made the transition to digital media at this time. In 1982 Telidon was an experimental technology not available in the consumer marketplace. The graphics creation system Howarth used was a prototype being actively worked on by a team of developers. In addition to the Apple II, the system included a drawing tablet, a serial card, and, most critically, a Telidon terminal, a special-purpose computer with the sole function of decoding Telidon files and rendering them on a CRT television monitor.<sup>5</sup>

Howarth's transition into digital art-making was not motivated entirely by the desire to turn the power of computing to humanistic purposes. Coinciding as it did with the birth of his daughter, it was also prompted by a desire for a more regular and remunerative lifestyle: "Since painting and drawing were going poorly and the opportunity arose to work in Telidon computer graphics, I put aside my freedom, dressed in a jacket and tie and did what I thought responsible Father's to be should do, walking down to the office each day, working in full colour with an electric pen."<sup>6</sup>

Along with his idealistic and practical motivations, Howarth was, at least at first, also motivated by the liberating effects of working in a new medium. "I had discovered the electric paint brush I had dreamed of," he wrote: "With Telidon and the Apple Computer it was possible to make shape as fast as I could think. While I have always loved pictures, and once loved painting, I now again began to enjoy making pictures ... often I



Above: Cover of *Gutenberg Two* (1979), an influential collection of essays about the cultural impacts of computer networks, edited by David Godfrey and Douglas Parkhill. [Mearns Centre for Learning - McPherson Library HN107 G87]

Facing page: Diagrams made by Howarth using Telidon. [Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives. Image courtesy of John Durno.]

- 5 Ernest Chang, *Design Considerations for the Telidon-Apple Picture Creation System*, technical report no. 16, (Victoria, BC: University of Victoria, Dept. of Computer Science, 1982).
- 6 Glenn Howarth to Jan, 24 May [1982], box 3, folder 14, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

No one knows what Telidon is. A coded series of electronic pulses drives a T.V. screen which I sit in front of, hour after hour, moving points, shapes and colours ~~xxxxxx~~. I draw with an electric pen, on a ~~xxxx~~ magnetized tablet connected to a computer, which codes the electronic impulses. Line red pops into existence. the line begins ~~xxxxxxx~~ begins at xy coOrdinates 94,50 and ends down the screen at 10, 204. The screen is 200 points by 256 points. ~~xxxxxxx~~ ~~xxxx~~ chromatic ~~xxxxxxx~~ ~~xxxxxxx~~ pixels dance. ~~xxxx~~ ~~xxxxxxx~~ the commands bec ome auotmatic, I forget about every world except the one I am creating. In love with amnesia, I forget where I am. Hiding the artist's fastest horse, making pictures on the computer.

The studio is a shrine. A complete inventory of artists materials, enough for the year, complete with framing. Vacant, and a plant which now refuses to drink water. The wooden walls are cold, and the varnished floor. The wood fired stove puts out too much heat and to little making the room unsuitable for the carefully controlled environment need by the computer. And the old stair case, that narrow, dark and dirty. clients arriving would be dismayed.



laugh each time I discover something unexpected. The apple computer is like a small sportscar which I drive.”<sup>7</sup>

Perhaps the most intriguing aspect of Telidon graphics for a practicing artist arose out of the technological limitations of early 1980s computing. Due to the slow data transmission rates and limited processing power of the day, when Telidon graphics were played back, they rendered incrementally and slowly, shape overlaying shape, until each image was fully formed. Howarth later identified this quality as central to his computer art aesthetic:

The beauty of these things is ...  
when I drew them, when I brought  
the picture back up, they would  
play back the process of drawing  
and assembling them. So in a sense,  
a drawing or a painting became not  
so much an experience of a single  
image, but it was like a sentence.  
The act of making it was extended  
through time.<sup>8</sup>

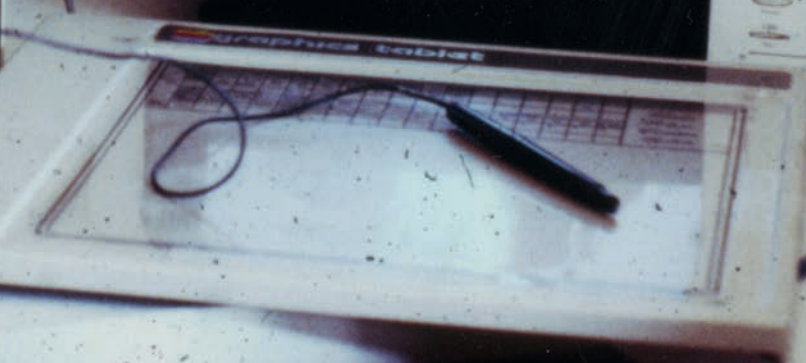
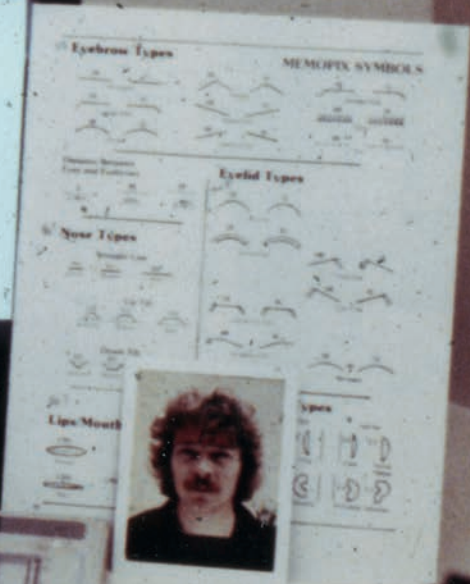
He further elaborated on this idea in a draft of a letter to the Canada Council, writing that “the screen holds fascination only so long as the picture remains promising and withholds a recognized result. When the

- 7 Howarth, untitled draft beginning “At the University...,” n.d., box 3, folder 15, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.
- 8 Glenn Howarth, lecture [videorecording], box 10, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

Typescript notes by  
Howarth about working  
with Telidon, n.d.  
(Continued on verso side  
of facing page.) [Glenn  
Howarth fonds, AR465, University of  
Victoria Libraries Special Collections  
and University Archives]







# “The Electric Paintbrush”: Making Art with Telidon



Most of Howarth's Telidon work was completed during two artist residencies, the first at Godfrey's company Softwords, and the second in the Department of Computer Science at the University of Victoria. The Softwords residency lasted from May 1982 through September 1983, during which time Howarth created hundreds of Telidon images (called "frames") that were combined into image sequences similar to slideshows. Some of these sequences were commercial work for hire, completed under contract to third parties such as the National Research Council and the Ontario Ministry of Education. Howarth created other sequences solely as part of his fine art practice. The second residency took place in 1984, underwritten by a grant from the Canada Council for the Arts. He created approximately 100 Telidon frames during the second residency, none of them work for hire.

Howarth was not the only Telidon artist working in Canada during this period, although he was an early practitioner and possibly the only artist in western Canada deeply engaged with the medium. Dozens of other Canadian artists, primarily from Ontario, Quebec, and Nova Scotia, were also exploring Telidon. Much of this activity centred on the artist-run collective Toronto Community Videotex, of which Howarth became a member. Early on, probably during his Softwords residency, Howarth made contact with other Telidon artists and began to explore collaborative possibilities. This communication ultimately resulted in

Detail of Howarth's  
Telidon terminal and work  
station, n.d. [Glenn Howarth  
fonds, AR465, University of Victoria  
Libraries Special Collections and  
University Archives]

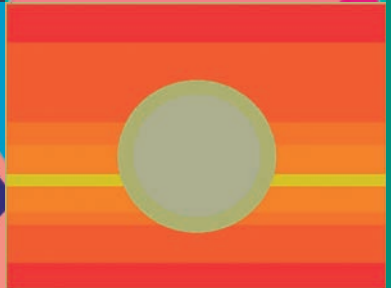


the show *Canadian Artists and Telidon* at the seventeenth Bienal de São Paulo in late 1983. Co-curated by Howarth, who also acted as Canadian Commissioner in São Paulo during its two-month run, the show included works by eleven artists, including Howarth himself. Howarth's copies of the São Paulo artworks survived on ten 8-inch floppy disks and are included in the Glenn Howarth fonds. The presence of Telidon at the 1983 Bienal—which featured American art star Keith Haring and the experimental art collective Fluxus—anticipated the later works of Eduardo Kac, who created “Reabracadabra” (1985) on a French Minitel videotex terminal, similar to Telidon.

The Howarth fonds contains a detailed report, of uncertain authorship, on the genesis and execution of the Bienal exhibition. Although funding for Howarth's proposal was approved by the Department of Cultural Affairs in April of 1983, bureaucratic delays caused the exhibition to be withdrawn in June. It was saved at the last minute through the intervention of the Photo/Electric Arts Foundation, a Toronto-based media arts organization whose representatives happened to be in São Paulo in August for a Super 8 film festival. Having secured an equipment loan from Special Telidon Marketing at External Affairs, the director of the foundation approached Howarth, who agreed to proceed on a shoestring budget of \$10,000 with only two months to go before the exhibition was to open. Howarth and assistant curator Paul Petro overcame these challenges to assemble a well-received show of Canadian Telidon artists that opened only one day behind schedule.<sup>13</sup>

In retrospect it is clear that the Bienal was the high-water mark of Howarth's Telidon career, but he carried on for a while longer. Howarth

13 Uncredited report on the 1983 São Paulo Telidon exhibition, n.d., box 7, folder 9, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.





continued to work in Telidon throughout the following year as a Canada Council-funded artist in residence in the Department of Computer Science at the University of Victoria. During this residency Howarth transitioned to working in the second version of the Telidon protocol, now an international standard called the North American Presentation Level Protocol Syntax, or NAPLPS. His creative output from this year was much smaller than the Softwords residency—fewer than 100 frames—but more nuanced in colour and composition, due to the enhanced capabilities of NAPLPS.

In February 1984 Howarth organized and taught a three-day Telidon workshop at the University of Victoria. A temporary lab in M Hut was assembled using borrowed equipment, including all eight videotex decoders available in Victoria at this time, one of which, Howarth noted, was “an early Norpak, an antique almost 7 years old.”<sup>14</sup> Eleven students attended the workshop, ten of whom contributed work to an anthology exhibited at the university’s Maltwood Gallery that May. Elegiacally entitled *Farewell to 699*, the exhibition marked the end of Howarth’s involvement with the first version of the Telidon protocol.

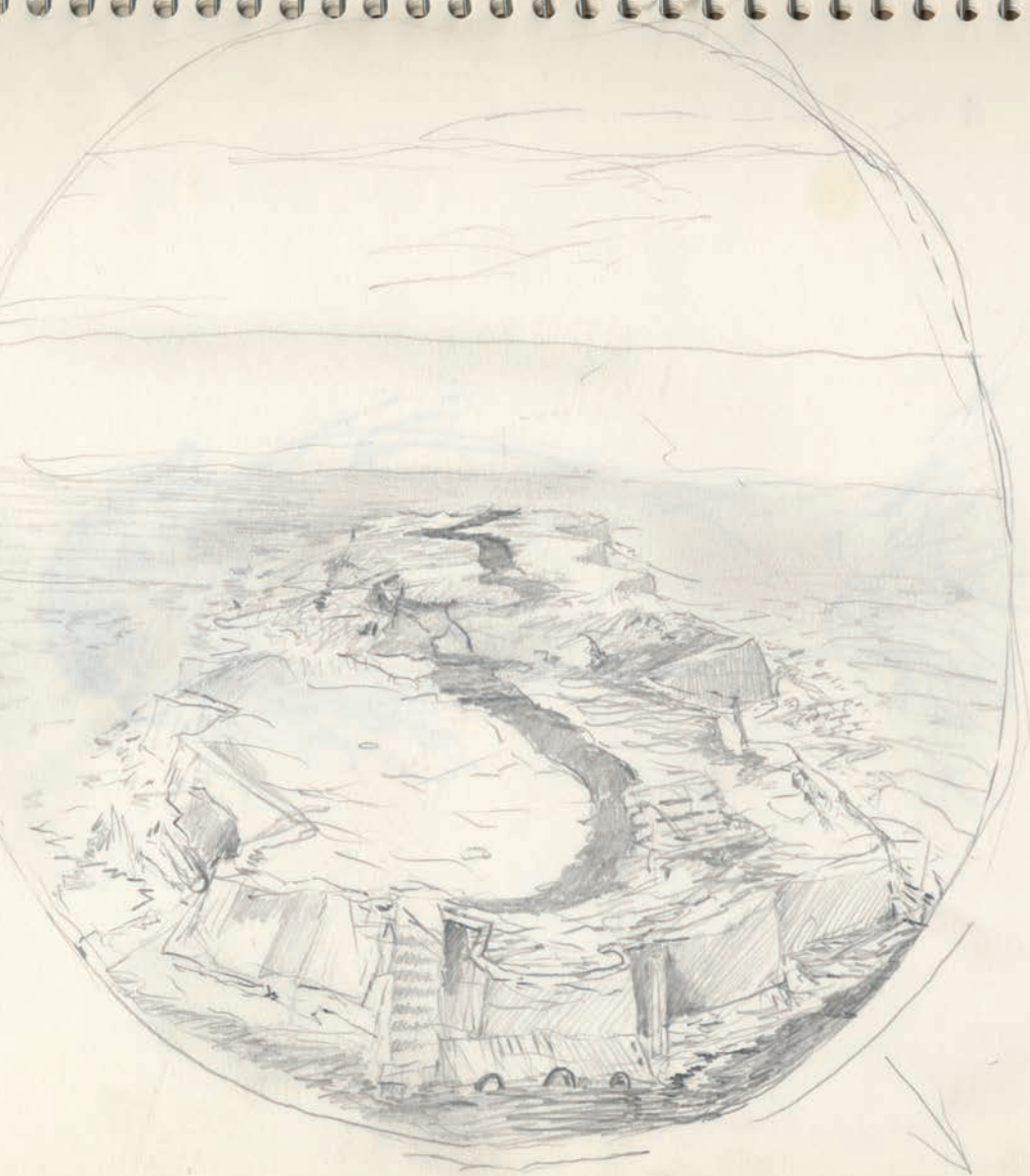
## Shapes Blown Apart: Digital Disillusionment

By the spring of 1984, Howarth was growing disillusioned with digital art-making. In a letter to Paul Petro, he wrote that “my hopes for NAPLPS are

14 Glenn Howarth, untitled report on Telidon workshop [computer file], n.d., box 10, folder 11, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.



Grid of stills taken from Howarth’s NAPLPS artwork. [Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives. Images courtesy of John Durno.]



greatly diminished. On an ebb tide of Federal money, B.C. Tel dismantled its database. . . . There seems to be no possibility out here for the media as I understand it.”<sup>15</sup> In addition to concerns about the viability of the medium, he was also plagued with technical problems: “During system development, it got so that I would put no effort into the conception of pictures, knowing that the attempt would end with all the shapes blowing apart, knowing also that the picture I made, when the software was changed would not be available for editing by the updated version.”<sup>16</sup>

From June through October 1984, Howarth’s work was exhibited at the Ontario Science Centre as part of the group show *Artist as a Young Machine*, but by October 1984 he had ceased making digital art altogether. There was a solo show of his Telidon/NAPLPS works at the Art Gallery of Greater Victoria in January 1985, but his heart was not in it. “No plateau has been reached, and no extraordinary effort on my part has been put into the show,” he wrote to a friend: “I merely needed the artists fee.”<sup>17</sup> Of his return to drawing and painting, he wrote, “there is more satisfaction. Did I tell you the value of these media might be their primitiveness?”<sup>18</sup> The electric paintbrush turned out not to be the paintbrush of his dreams after all.

In truth, Howarth had always had doubts about Telidon. Even as early as his Softwords residency, he had expressed concerns about the apparatus of digital art-making: “The true art might be in the creation of the microchip and in the multilayered systems. Electronics and computer

15 Glenn Howarth to Paul Petro, 2 April 1984, box 7, folder 3, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

16 Howarth to Paul Petro, 2 April 1984.

17 Glenn Howarth to Char, 14 January [1985], box 3, folder 15, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

18 Howarth to Char, 14 January [1985].



design, manufacturing systems, machine language, programming language, and finally like the candles on a birthday cake, my input creating pictures. I am dependent on too much.”<sup>19</sup> These concerns were elaborated and amplified in his farewell letter to the medium, “A Letter from Glenn Howarth,” published in a catalogue of essays accompanying the 1985 exhibition *Art is Communications* at A Space Gallery in Toronto. “After I read the biography of Alan Turing I turned my computer off,” he recounted in the essay, because “in Alan Turing’s 1936 paper, *Computable Numbers*, I would never find expression for my pictures.... It was his computer at the end of my hall; it would be forever dedicated to his universe of parallelism and to the brilliant simplicity of his invention.”<sup>20</sup>

At the heart of Howarth’s somewhat elliptical argument in the essay is the conviction that the serial nature of computer processing cannot produce images presenting the simultaneous interrelationships of form and colour that characterize traditional visual media. This argument is easier to understand when we recall that the gradual emergence of the finished image was indeed fundamental to the aesthetics of Telidon art. Howarth dated his official return to oil painting to March 9, 1985, three weeks prior to the end of Telidon itself.<sup>21</sup> Federal funding for the Telidon project was formally withdrawn on March 31 of the same year.

19 Howarth to Jan, 24 May [1982], box 3, folder 14, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

20 Glenn Howarth, “A Letter from Glenn Howarth,” *Art is Communications*, ed. Paul Petro (Toronto, ON: United Media Arts Studies, 1985), 25.

21 Howarth, “A Letter from Glenn Howarth,” 25.



# “servitude to systems”: The End of Telidon

Glenn Howarth's  
Telidon Art

Although Howarth made little, if any, digital artwork after 1984, his involvement with digital art continued for a while longer. In the first half of 1986, he took a contract as an instructor of digital picture processing, graphic design, and drawing at Cariboo College in Kamloops, BC. He described his time there as fraught with administrative difficulty, wrangling with a variety of next-generation graphics systems purchased by a predecessor. His resolve to abandon digital art-making did not waver. “There is no desire in me really to continue making pictures on screen,” he wrote: “I am surprised at the speed, and the colour capability here, but there is a servitude to systems, to their cost and maintenance, which here involves me in a forest of administration and detailing.”<sup>22</sup>

By the summer he was back on the West Coast, employed as an instructor of computer art at Expo 86 in Vancouver, with a focus on the new Commodore Amiga as well as Telidon equipment.<sup>23</sup> It did not go smoothly. In a letter to Tom Graff, the Curator and Special Programs Coordinator for the Canada Pavilion, Howarth expressed his frustration: “Invited to display my existing videotex landscape pictures on the Pavilion database, I found my display files incompatible with Dominion

22 Glenn Howarth to Paul Petro, 19 January [1985], box 7, folder 3, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

23 Dan Kramer to Glenn Howarth, 30 April 1986, box 6, folder 6, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

Report by Howarth to  
JEM Research, n.d.  
(Continued on verso side  
of following pages.) [Glenn  
Howarth fonds, AR465, University of  
Victoria Libraries Special Collections  
and University Archives]

slide, slotted, traveling on the same nut. And on the ends of the horizontal slide, at a standardized hole punch distance, two plastic registration pins. The command squares of the graphics tablet printed on a pre-punched ~~tablet~~ sheet of semi-transparent paper, ~~xxxxxx~~ ~~xxxxxxxxxxxx~~ the would be in register along with a printed grid of the telidon screen format.

~~Printed Telidon~~  
~~Tablet screen format~~ <sup>35</sup>! On paper, in tablets used for layout and sketching. Disposable. Two centered light blue axis. And a descending grid pattern which allows a pixle to be located without looking at the screen, ~~but~~ <sup>but by</sup> ~~from~~ reading the co-ordinates ~~fx~~ from the monitor.

#### Turtle cursor.

-----  
Instead of a flashing dot, a straight line with a single pixle gap. ~~xxxx~~ <sup>cursor</sup> the point is found not by twining point-to-point but by negating ~~of~~ a line of ~~xxxx~~ of points in the surround.

That the ~~cursor~~ <sup>LINE</sup> rotate by keyboard instruction through <sup>180°</sup> degrees. That the cursors last position ~~be~~ <sup>be</sup> the default would be useful for polygon parallelisms, ~~and for~~ <sup>for</sup> ~~measuring~~ <sup>measuring</sup> the angle ~~of~~ perspective angles. ~~Failing~~ <sup>could be</sup> keyboard instructions, the angle could be pumped on the graphics tablet, in 1, 2X, 4X 8X increments.



directories' database software... when the files were installed, they remained corrupt, fragmented, and were disfigured by blacker than black screen prompts."<sup>24</sup> The Telidon picture creation software provided for him fared no better in his estimation; he dismissed its interface as "chatty baroque."<sup>25</sup> The presence of the Amiga cast the shortcomings of the Telidon technologies into high relief: "it was impossible having used this new Amiga hardware with its high speed interaction and pointer interface, to feel anything but frustration at the unwieldy response of the videotex equipment."<sup>26</sup> It was an inescapable conclusion, one that many Telidon artists were coming to share: the once-promising technology was now obsolete, superseded by more powerful, lower-cost graphics systems making their debut in the consumer technology space. It is worth noting that at exactly the same time as Howarth was struggling at Expo 86, a similar struggle was underway at the 1986 Venice Biennale, where an exhibition of Canadian Telidon artworks had to be cancelled due to technical difficulties.<sup>27</sup>

The last recorded public exhibition of Howarth's digital artworks during his lifetime occurred in March 1987, accompanying a lecture at Toronto Community Videotex shortly before the collective changed its name to Inter/Access.<sup>28</sup> As the 1980s waned so did any lingering interest

24 Glenn Howarth to Tom Graff [computer file], 2 July 1986, box 10, folder 4, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

25 Howarth to Tom Graff, 2 July 1986.

26 Howarth to Tom Graff, 2 July 1986.

27 Geoffrey Shea, "Telidon," *Dead Media Project*, ed. Bruce Sterling and Tom Jennings, accessed May 8, 2018, <http://www.deadmedia.org/notes/2/024.html>.

28 Glenn Howarth to Paul Petro [computer file], 20 January 1987, box 10, folder 7, Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives.

Text mode. Outline mode for larger text.

Text mode as text. Set cursor, for beginning of text line. Move to the keyboard, and do everything, in text, including the colour, ~~k~~ on the keys. It would be quicker than taking ~~xxxxxx~~ one hand off the keyboard to pick up the pen. This would avoid the two reaches for the pen, one to set the toggle, if the default colour is grey, or colour if the desired ~~text~~ is to be grey, and another <sup>pen lift</sup> for the shade ~~of~~ colour command.

Background mode. With five pictures stacked in background mode, a refresh, I(nsert, modify, move, cause the screen to return to the beginning of the tunnel, and the wait to return to <sup>foreground</sup> ~~xxxxxx~~ invention is interminable. If the backgrounds could remain stable, and the ~~fix~~ refresh confined to the ~~xxxxxx~~ edit~~ed~~ frame, for long assemblage, the ~~xxxxxx~~ waiting ~~xxxxxx~~ would be reduced.

Machine morality.

The PCS boots to the intital question. Do you wish to edit an old picture? If you do not and wish to make a new one, the creation process begins with a lie. A poor beginning ~~xxx~~ when the artist ~~xxxxxx~~ says yes. I want to edit a ~~new~~ old picture. Perhaps it is truw that in some sense new pictures are conversions of old ones. (create/edit) a picture is ~~xxxxxx~~ accurate.

in videotex, and as the years went by the hardware and software needed to display the artworks became harder and harder to find. By the late 1990s it was generally acknowledged that the Telidon works of Howarth and dozens of other artists could no longer be seen and that the medium was “dead as a doornail.”<sup>29</sup> Although the computer files themselves lingered on floppy disks in boxes and filing cabinets, the means to render them as images were thought to have been lost.<sup>30</sup> That state of affairs persisted until 2015, when the University of Victoria Libraries Special Collections and University Archives began a project to restore Howarth’s digital artworks to accompany a retrospective exhibition planned for the following year.

## Telidon Regained: The Restoration of Glenn Howarth’s Telidon Art

Howarth’s Telidon artworks arrived as hundreds of digital files contained on two dozen 5.25-inch floppy disks. The first step in the restoration involved transferring copies of the files to modern storage media using standard forensic data recovery techniques.<sup>31</sup> Examination of the files revealed that Howarth had created works in two different versions of the

29 Shea, “Telidon,” *Dead Media Project*, ed. Bruce Sterling and Tom Jennings, accessed May 8, 2018, <http://www.deadmedia.org/notes/2/024.html>.

30 Shea, “Telidon.”

31 See John Durno, “Digital Archaeology and/or Forensics: Working with Floppy Disks from the 1980s,” *Code4Lib Journal* 34, 2016.

R Drop shadow. Form commanded, ~~xxx~~ a ~~xxxx~~ copy inserted is  
be hind which ~~it~~ is dropped one pixle, two or three  
pixles, in a chosen colour. The same function could be  
used for hightlights where the background copy moves  
upwards ~~xxx~~ a ~~pixle~~; Like the drop shadow, ~~xxx~~ <sup>the highlight,</sup> gives the figure  
~~xxxx~~ an illusion of volume.

#### Integration of multiple frame.

Having created ~~one frame~~, and a series of <sup>discrete</sup> frames  
~~following~~ in overlay, to assemble pictures discrete under separate  
file names into, one picture, ~~xxx~~ would extend disc storage,  
and the capacity of the show programme directory.

Telidon standard: Telidon 699, the draft version used in Canadian field trials in the early 1980s, and NAPLPS, the mature version used across North America in commercial videotex services and in the Prodigy Online service later in the decade. The NAPLPS artworks were the easiest to restore, as software capable of rendering NAPLPS graphics is still available. In the early 1990s the Nepean, ON-based company Microstar released their NAPLPS software in a massive online shareware repository called Simtel, mirrors of which remain on the web to this day. Howarth's NAPLPS works were rendered using the Microstar program PP3 running in the DOSBox emulator, slowed down to match the speed of mid-1980s PC hardware.

The Telidon 699 works proved more difficult to restore. NAPLPS was not fully backwards-compatible with Telidon 699, so it was not possible to use the Microstar software to render the earlier works. In fact, software capable of rendering Telidon 699 graphics never existed as such, for the simple reason that early 1980s consumer-grade computers would not have been powerful enough to run it. Instead, rendering Telidon 699 required a specialized device called a Telidon decoder. Because Telidon 699 was never widely deployed, not many of these devices were ever produced, and they are now very rare. It was extremely fortunate that the University of Victoria Libraries was able to locate a still-functioning decoder in the collection of the SPARC Radio Museum in Coquitlam, along with a highly capable volunteer, Brent Hilpert, willing to assist with the maintenance and operation of the 35-year-old piece of equipment. During a series of recording sessions in the spring of 2016, Howarth's works were transmitted to the decoder over a serial connection and rendered on its built-in CRT monitor. The output was captured using a video camera pointed at the CRT, its frame rate adjusted to match the refresh rate of the monitor. Although this recording method was

Glenn  
Howarth



somewhat primitive, it had a certain authenticity: our research indicated that the same method was employed by the Telidon artists themselves back in the 1980s, when transferring their works to videotape.

In all, almost two hours of Telidon graphic sequences were recovered from floppy disks in the Howarth fonds. The restored works are now securely housed as digital video alongside the original image files on the University of Victoria's enterprise storage network. Using a combination of emulation, period software, software reconstruction, and the generous loan of the vintage 1983 Telidon terminal from the collection of the SPARC Radio Museum, it proved possible to make all of Howarth's Telidon artworks viewable once again. Techniques developed for the Howarth restoration work are now being used to restore the artworks of many other Canadian Telidon artists that have since come to light in the collections of Inter/Access in Toronto, Artexite in Montreal, and the personal collections of the Telidon artists themselves. Once thought to have been lost forever, Telidon art is poised for re-evaluation as an important tributary in the development of media art in Canada.

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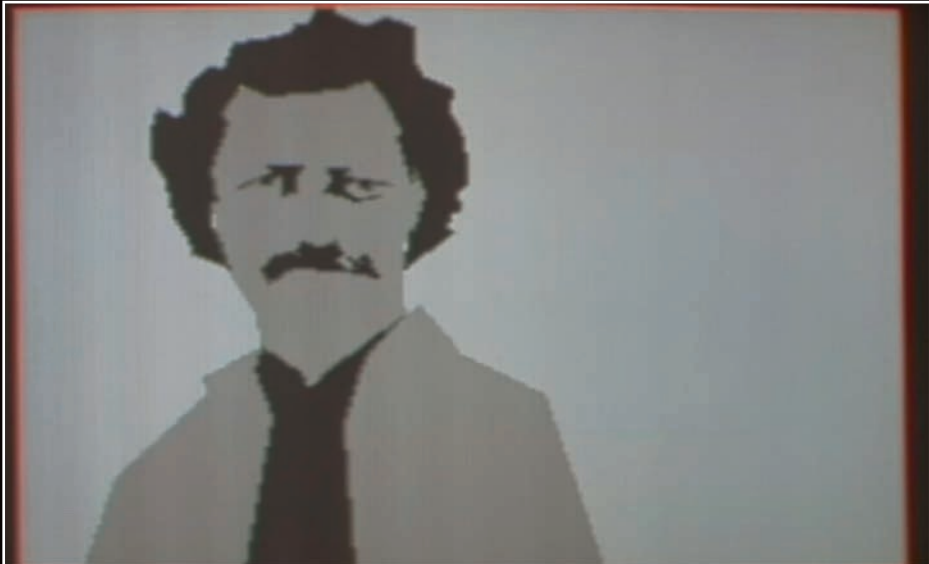
Above: Howarth. [Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives]

Facing page: Howarth's studio in Fan Tan Alley, n.d. [Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives]



"Starfish!," an example of Glenn Howarth's Telidon art. [Glenn Howarth fonds, AR465, University of Victoria Libraries Special Collections and University Archives. Image courtesy of John Durno.]





Screenshot from Louis  
Riel, one of Glenn  
Howarth's Telidon works.  
[Image courtesy of Christine Walde.]

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Telidon test screen. Image  
courtesy of Christine Walde



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