

20. Domains of Study

For the first sixteen years of my education, study was simply a passive exercise, doing the homework that others had imposed. The teachers were the bearers of knowledge: I was simply a receptacle. If I was a sufficiently good receptacle, I would one day know all there was to be known, at least in my field of study.

Undergraduate (1966-1969)

In the third year of university, I took a fourth-year course on intellectual history with Professor Brayton (Brady) Polka. It was a seminar. Each week we read a sample from a great thinker including Plotinus, Augustine, Abelard, Valla, Vico and each week we were plunged more deeply into the complexities of a Western tradition that continually built on Plato and Aristotle, while also transforming their original premisses. The most important thing that I learned was that the great texts were more than clever answers: The greater the text, the more it raised questions for which there were no simple, glib answers. The world of learning, which until now had simply seemed a series of textbooks and encyclopaedias to be digested began to change its appearance: it was a world of questions and challenges to be actively discussed and understood rather than simply absorbed, copied and transmitted.

In fourth year, there was an option to substitute a regular course with an undergraduate thesis. I opted to do this under Brady Polka. The topic was *The Escape from Perfection, the Discovery of Man*. Without suspecting it I had chosen one of the leitmotifs of my life. The claim was simple. The Greeks developed an ideal of perfection, which led to wonderful art, but also given the etymology of the word *per-ficio* (to put an end or limit to) led to a limited view of the world. By contrast, the Renaissance, 1500 year later, which explored the concept of infinity, which had evolved within the Christian tradition, introduced a vision of man who, in spite of imperfections, failures and weaknesses, was human, loving, and whole.

M.A. (1969-1970)

The thesis received an A+. Unbeknown to me, it was given to Professor Natalie Zemon Davis at the University of Toronto, where I was destined to do my M.A. She was on sabbatical but offered to give me a private seminar which launched me into the complexities of historiography, reading Bakhtin, Marxist historians and other schools. I was so enthused that I assumed that she and Stillman Drake, a world authority on Galileo, would be my doctoral advisors, but it was not to be. One day in November she told me that she had been given a chair at Berkeley and felt that it was not the right place for me. She went on to become the President of the American Historical Society. Hang on a minute she said, picking up the telephone to call Rosalie Colie at Brown. 5 minutes later she put down the phone and announced matter of factly: well, Brown has accepted you for a doctorate, but Rosie agrees with me that you need discipline and that you should study with Professor Gombrich. You should write and say you want him as your mentor and so I did.

Meanwhile, the B.A. thesis, which was my first attempt at a complete answer with respect to the human condition had raised more questions than answers. One day I went excitedly to meet Professor Etienne Gilson to explain my concerns. The great scholar listened amicably and patiently only to finish with: “Mais jeune homme, vous n’êtes pas un historien, vous êtes un philosophe.” In my naiveté, I took this as an insult and only gradually realized that it had been one of the most generous compliments I had ever received thus far.

The unfinished business of the thesis had to do with claims made by Ivins about differences between the Greeks and Renaissance. The Greeks, he argued, believed in a finite world, were tactile and thus preferred sculpture over painting. The Renaissance he claimed, believed in infinity, was visual and thus preferred painting to sculpture. All well and good, I thought, but if I need eyes to see both a sculpture and a painting, precisely how and why does the Greek world differ from the Renaissance? These were ideas that McLuhan had pursued.

Stillman Drake, a wise and wonderful teacher, who guided rather than ordered, listened carefully to my question or rather Problematik and quietly suggested I should start looking carefully at texts on optics from Euclid through to the Renaissance in order to see what changed. For starters, he sent me to read the *Divine Pimander* of Hermes Trismegistus (1583). As the year progressed, it became clear to me what he had understood from day one: that this topic was much too vast for a Master's thesis. So, it was agreed that I would write a paper on 16th century theories of colour to satisfy the everyday academic requirements. One of my professors, who taught reformation history, had mistaken my being bored stiff, with lack of intelligence and had started a campaign to stop me studying further, but fortunately something happened.

Behind my back, Natalie and Stillman, were also in touch and proposed me for a Canada Council Doctoral Fellowship. Meanwhile, a bemusing correspondence had begun with Professor Gombrich: did I have any languages: yes, Dutch, French, German, Latin, and reading knowledge of Italian, Spanish and Frisian. Then there was a mail strike. Then came a letter that I had two weeks to decide where to study for the doctorate. My letter to London was simple: I have a scholarship do you want me or not? They did.

Ph.D. (1970-1975)

It all began very differently than imagined. I had arrived early to orientate myself in London. On the fourth day, I ventured to visit the Warburg Institute where I almost literally bumped into Annaliese Meyer, the rather formidable secretary. Within a few seconds she announced: the Director will see you now. Within two minutes I was sitting in the office of soon to be Professor Sir Ernst Gombrich, a scholar with 26 honorary doctorates. The conversation was near surrealistic. What do you think of footnote x in Panofsky's *Perspektive als symbolische Form*? I had of course read the article but admitted that the footnote was not uppermost on my mind. Did I read Swedish? What did I think about the theories of Sjöström and Bjöström? After an excruciating half-hour the professor announced that he would, of course, be delighted to see me in his doctoral seminar, but that he felt I should study for the year with Dr. A.I. Sabra.

In my wonderful ignorance, I had never even heard of this man and had not the faintest idea that he was Sir Karl Popper's best student and the world authority on Arabic optics. When I went to meet him, I was duly asked about languages and rather smugly listed my range which, by Canadian standards, was more than enough. What, asked Dr. Sabra, no Hebrew, no Greek, no Arabic? It is a long time that I have met such an ignorant person. There was a course in Greek beginning that very evening and I was duly sent, a practice that continued for the next six years. In the spring, I was asked how my Arabic was progressing. I was sent on scholarship to the Bourghiba Institute in Tunis for two summers and continued at night school for five years.

Dr Sabra was the best of teachers, wonderfully gentle, incredibly precise and at first glance very easy going. What was my topic he asked? I told him of the topics I had begun exploring

during the master's degree. That was fine he said. You should get a reader's ticket for the British Library and begin reading. The usual custom is that you report back once a month and let me know how you are getting on. It all seemed too easy.

The first monthly meeting continued this illusion. The second monthly meeting began seemingly innocently with two questions: I did have Latin did I not? Had I read Ptolemy's *Optics*? The answers were yes to the first and no to the second. Well then, perhaps I would like to translate Book two of Ptolemy's *Optics* for next week? I rashly said yes. There were a number of books awaiting me at the British Library, so I put off looking at Ptolemy for a couple of days. Then I realized that there were 60 pages. Admittedly some pages had far fewer lines of actual text but in these cases the manuscript variants, i.e, the ambiguities were proportionately longer. For the next days, I was up till 2 or 3 each night. Exactly a week later, exhausted I rushed into Dr. Sabra's office. I have finished the translation I announced triumphantly. What translation? he asked as if he had forgotten. Just lay it down and I shall look at it anon. Confused, I ran out even more quickly than I had run in.

The next week, Sabra said: Oh, by the way, I have read your translation. It is fairly good. Why don't you do the next book for next week. And so life went on. When Ptolemy's *Optics* was finished he asked me to translate Alkindi's *Optics* from the Latin. The petty man in me was furious. What do you think I am: a translating machine, I asked? His face took on a gentle but firm countenance: You have done Ptolemy in 3 weeks. Alkindi is shorter. It will only take you two weeks. The world has waited 1100 years for a translator. What right have you to keep the world waiting any longer? I was not clever enough to defend myself against such logic. And so Alkindi was translated. At this point, Dr. Sabra, made another suggestion. The Ptolemy translation was useful but raised many questions. It would be useful if, in the next semester, we devoted a seminar to it.

Ostensibly I was leading the seminar because it was my translation. In reality, I was being plunged into a whole new realm and level of scholarship. Ptolemy had written the *Optics* in Greek. Thereafter, it had been translated into Arabic. In 1141, Roger, the Emir of Sicily, had translated the Arabic back into Latin. Lejeune had edited that translation which was the basis of my translation into English. Each week we would begin with a sentence. What might have been the original Greek terms behind the key words of that sentence? What was their etymology? What were the corresponding Arabic terms for those Greek terms? If the Arabic was x, would the Latin be what was before us? It was like an archaeology of words and sentences. In an average two-hour seminar, we managed two sentences. Half the time, I was speechless in admiration how seemingly non-descript "students", many of whom had PhDs, would do the etymology of Greek, Latin and Arabic words as if this was an everyday exercise: in fact, it may well have been for them. Needless to say, we did not finish the translation, but like those sublime unfinished symphonies in music, this opened up a new dimension of a deeper world of learning: where there are no glib answers.

The British Museum Library

The London adventure was a series of surprises. Soon after arriving in London, I had registered as a reader at the British Museum Library. There was a very efficient looking lady in her 50s who did the paperwork in the enormous round reading room which had been the working space of famous authors such as Karl Marx. Once she was finished the lady welcomed me and then shocked me: Of course, we won't be taking you seriously for the first two years. This was not

what a slightly over-self-confident graduate student with a doctoral fellowship expected to hear. Why not, I asked? Well, the books you see (roughly 400,000 books in a large circular room)¹ are not the library. They are simply reference books which are the tools to use the actual library which is behind the walls. She was, alas, right. It took nearly two years to realize where the dictionaries, encyclopaedias, book catalogues, the Teubner series of all Greek mathematical texts and so much more were positioned. It took three years before they allowed me into the stacks of the actual library, locking me in for a couple of hours as I traced obscure references.

In the meantime, the daily visits to the reading room of the British Library were increasingly becoming visits to the North Reading Room for rare books. This was an adventure in itself. There were remarkable characters. Opposite me was a psychiatrist who always had at least 15 books on his desk, had been there daily for the past 15 years and was currently working on pyromania as related to psychiatry. Every now and then we would have a coffee together and I would ask him burning questions.

There was a clear sign stating that it was strictly forbidden to consume food in the library. I had only been in the North Library a few days when a lady with an ostentatious hat and a huge picnic basket arrived. At noon, the picnic basket was opened and copious amount of food were consumed. No one said or did a thing. In a combination of bewonderment and outrage, I decided to take action. I rushed up to the service desk to report the “crime.” Oh, said the librarian in a relaxed tone, The sign only applies generally. Mrs X is known to us. She has been coming here for 40 years. I suddenly realized that I had a lot to learn on all fronts and went back to my books.

As the second semester was drawing to a close, Dr Sabra took me aside one day. He explained that Harvard, Princeton and Yale had all offered him a chair on his own terms. He had decided to go to Harvard, because there was a professor there with whom he could speak. I was welcome to come along but given my topic, there were more books in London. But who will look after me I asked anxiously? Gombrich. He does not not approve of me, I said. You should have a chat him and I think you will find that things are not as bad as you fear.

A meeting occurred. More or less the same questions were asked. By now I had at least an opinion on every one of them. It was agreed that we would meet again in the next term. The first meeting of term plunged us into a heated discussion. After an hour, I had to excuse myself due to a prior engagement. Come back next week, said the master. The next week was equally animated. Gombrich, as a good Viennese scholar in the Hebrew tradition, was deeply fascinated by the psychology of optics and perspective. I, as a Nordic, was more fascinated by the objective dimensions of perspective. It was the perfect context for disagreement. A lesser man, would have insisted that I see things his way. But it was a testimony of Gombrich’s magnitude that he never imposed his views. He was happy to be opposed as long as there were well stated reasons and of course mutual respect.

On the third of our meetings, he noted that it was not usual for him to meet a student on a weekly basis. The Warburg tradition was once a month for doctoral students. If I am wasting your time then I shall be happy to go, I interjected. No, said the professor, that was not what I said. I just wanted you to be aware that this is atypical.

The weekly sessions went one for year and half. They were more than regular sessions. They were a kind of initiation that took place in very conscious steps. It was as if I were a piece in a chess game. In the earliest meetings, the professor sat behind the barricade of an enormous desk. As the weeks progressed, his chair moved slowly to the side until there was only an empty

space between us. Then the chair came closer until one week were sitting beside each other examining a text, the *Imagines* of Philostratus. Very interesting, said the professor. Here you have a Greek term *αναλογία*, which is linked with the English word analogy of course. The Romans translated this as *symmetria*. What is fascinating is that some Renaissance editors translated this as *perspectiva*. For next week why don't you simply go through all the editions of Philostratus to see what happens? How many editions are there? Roughly 40, if I recall. You want me to go through 40 books? Yes, but remember you only have to deal with one paragraph so that makes only 40 paragraphs. Great teachers, I was beginning to realize, are not just hollow names. They teach us to look at the world in unexpected ways, to order 40 books to see what happens to one word in the course of two millennia.

Aside from psychiatrists and ladies in colourful hats, there was a lot more to learn in the North Reading Room of the British Library. I learned a great deal about ancient theories of vision. As a third year was coming to an end, I wrote down my findings and came to just over 120,00 words. The acceptable length for a PhD at London University was 100,000 words. I realized that I had not yet said a thing about what really interested me so I decided to start afresh. By now I had an answer to my question: what was different between Greek and Renaissance optics. Notwithstanding, three propositions in Euclid's *Optics* relevant for surveying, Euclid was basically not interested in distance. By the 9th century, this had changed in the writings of Al-Farabi, which introduced a link between optics and surveying. And by the 15th century it had changed again. Now the concern was not merely to link optics with surveying, but to link them via represented images. By the 15th century, *perspectiva naturalis* (optics) and *perspectiva artificialis* (perspective) had become distinguished but remained intertwined.

When I set about to write about this shift, another detail became the focus of the thesis. The invention of perspective is often described as a single event. In Panofsky's account, there were two methods: one was theoretical and Italian: the *costruzione legittima*. A second: *das Distanzpunktverfahren*, was practical, workshop-based and German. In my own analysis, the story was different. Both methods were Italian. The *costruzione legittima* was linked with surveying practice. The distance point construction was linked with theoretical geometry. To contradict one of the titans in the field with careful demonstrations was recognized as worthy of a doctoral title.

Perspective (1970-)

While the doctorate was approaching its final stages I had been in touch with authorities in the field. One was Luigi Vagnetti. Another was Eugenio Battisti. At some point Battisti, decided to organize a first world conference on perspective. He sent Professor Marisa Dalai Emiliani, who came to London to meet the authorities: Sir Ernst Gombrich, Professor B.A.R. Carter, and Professor John White. All mentioned a young doctoral student. When she finally met me, she confessed to being impatient and sceptical about meeting a young person praised by three prima-donnas. The consequences were life-changing: I was invited to do the standard bibliography for the first world conference and, since she had heard of an invited article which Daedalus had rejected for being too complicated, she agreed to publish it as an appendix to the conference. In one afternoon, I had changed from being an insignificant student, to a player on the world stage.

Initially, the bibliography was simply a list of titles, which I had already begun as part of my doctoral studies. When the world conference took place in 1977, all the participants were

directly requested to share their titles with me and hereby the number of titles grew dramatically. Starting in 1977, there was also my one day a week visit to Göttingen. By 1979, Luigi Vagnetti, published his monumental bibliography 50 years in the making. We had been in constant touch, but I now found myself in a dilemma and told him so. It seemed indecorous for a young person to publish a competing bibliography, which merely had a few hundred more titles. What should I do? Come to visit him was the answer. So, I went to spend a morning with him. He told me that knew nothing about perspective in Russia, India, China, Australia or North or South America. And you know what that means, he said quietly: no one knows. I am old. You are young: you should write to those places. Then you will make a contribution. So, I went home and sent 65 letters to the great libraries mainly in those countries. 60 of those replied. In a morning, another master had changed my life. Three weeks later, he died from a heart attack. I had been one of the last persons to speak with him academically. In a few hours, he had given me several years of homework.

Vagnetti's bibliography had been an annotated one: i.e. a little comment about each of the titles. It seemed redundant to repeat this exercise. And yet a simple list seemed insufficient. I decided to write two introductory volumes: one for the primary sources; another for the secondary sources: one to explain how linear perspective had evolved into a key new method in Western art and science during the Renaissance; another to explain what happened to perspective in modern times and to record the main views of scholars on the history of perspective.

This straightforward intention proved anything but simple. In a sense, it defined one of the biggest questions of my life: what leads humans to change their ways of image making? What are the underlying goals of art? These were questions that had defined the career of my great mentor, Gombrich, and he had offered important guidelines. One, entailed primitive art (*The Preference for the Primitive*). Another, he claimed, was imitation (*Art and Illusion*). Another was pattern and regular geometrical shapes (*A Sense of Order*).

This gradually led me to six and later seven goals of art: 1) Primitive, I called the goal of connecting: when the representation is less for its own sake and more as a means of connecting it via sympathetic magic or trance to objects beyond it. 2) The quest for order I called ordering (decorative arts, symbols, patterns). Gombrich's imitation I split into two: 3) mimesis, where one imitates at the level of ideal combinations (Antiquity) and 4) matching (Renaissance), where the goal is to create a direct correspondence with the physical world. Matching began with direct copying of visual sources but extended to copying via verbal sources.

The 19th and early 20th centuries introduced a new goal: 5) mixing, when one began to play with the strict rules of perspective, e.g. size-distance law; window as opening and wall as occlusion. The 20th century added another: 6) exploring, when representation went beyond matching the physical world to include the mental and perceptual world and chance: in simple terms when realism expanded to include abstract art.

These categories did not just appear in a day. They emerged in long discussions in my Wolfenbüttel period and in Toronto, where, unfortunately they did not fit into the intellectual climate. Historians of science felt that they had little to do with their discipline. Historians of art in Toronto who tended towards the connoisseur tradition, had little interest in such generalities. I was an outsider and gradually I was excluded from the university. I had come as an expert in perspective; had taught graduate courses on perspective; also had a vision for a new approach to art history, but gradually this was suppressed. By 1996, new media became

my livelihood and the perspective project was put on ice. It would be 20 years before I returned (see below) to add a seventh goal of art and to redefine my quest for understanding truth.

Leonardo da Vinci (1475-1519)

The dynamics of the next step stemmed largely from an omission in the previous step. I had been well aware that Leonardo da Vinci had written on perspective, but had been put off by his habit of writing backwards in mirror script. A friend at the Wellcome Institute for the History of Medicine, Marianne Winter, was celebrating the publication of her book on *Tibetan Medicine*. There I was introduced to the world expert on Leonardo's science, Dr. Kenneth Keele. Somewhat naively, I asked him if he could help me on the topic of Leonardo's perspective, promising him a footnote in recompense. Dr. Keele, an old-fashioned Englishman, who did not discuss work at parties, smiled, said that would take two years and walked away.

Two weeks later, he appeared again, this time at lunch, to his right was Dr. Noel Poynter the director of the Wellcome Institute. As a visitor, I had no way of knowing that the two had been friends for over 40 years. I asked the question again. He gave the same reply: that would take two years. But now he elaborated. People have dismissed Leonardo as a purely speculative person, a maker of thought experiments. One would need to reconstruct the experiments to determine that they were real. The unassuming Director agreed and suggested: the two of you should work together.

A couple of hours later, as if by chance, he found me in my makeshift office. I was quite serious he said. I just want you to know that you will have the full resources of the Wellcome at your disposal: our carpenter to build you models, our photographer and anything else you need. Kenneth is a friend. I thanked him and went home in a daze. For the next three days, I was still in a daze as it gradually dawned on me what had just happened. The Director of the greatest institute for the history of medicine in the world had just given me a sort of carte blanche.

Three days later I submitted some initial ideas for models to be built. Then the experiments began and continued for a number of months. One day, Dr. Keele arrived and asked what I was doing after the doctorate. I explained that it was assumed that Canada Council holders returned to Canada to teach. I added that as a person without independent means there were no other options open to me. But what if there were means? Would you welcome that? Yes, I said almost too enthusiastically. Well then, perhaps you would be good enough to fill in this form. It was a single page. It was simplicity itself. Name, topic of interest (Leonardo's perspective), two persons to support the idea (Gombrich and Keele) etc. Five minutes later I handed it in.

Three weeks later, Dr. Keele sauntered into the room congratulate me. You have been made a senior fellow of the Wellcome Institute. I was flummoxed. I am not even a junior fellow, I protested. Now listen here, said Dr. Keele. I am too old to be a junior and I am incapable of dealing with persons who are not my equal so the only solution is for you to be a senior fellow.

My initial interest in optics and perspective had been with respect to a shift from sculpture to painting. As the studies progressed, I realized much more was involved. In Antiquity, optics and representation as scenography (*scenographia*) were both subordinate to scenography, to a world of illusions and optical deceptions. By the time of the Renaissance, optics had a much nobler goal. It has become a key to establishing an objective relation between an object, interposed plane (window) and eye. Perspective was not just a new way of drawing and

painting. It was a key to concepts of objectivity in the West: one of the standards for truth in the visual realm.

Studying Leonardo as one of the greatest geniuses of all time was to see how a monumental human had dealt with the challenge. It was like asking how would one of the best minds deal with the one of the most important questions? It was certainly not an easy question and it was certainly worthy of becoming my principal activity for nine years of my life: two in London and seven in Wolfenbüttel.

Wellcome Institute (1975-1977)

As for the new fellowship, there was only one condition. I had to finish my doctorate. The day came. We were due to start in a week's time. Once again, Dr. Keele, sauntered into my room. There has been a complication, he announced. Her Majesty the Queen wants a new edition of the Anatomical Manuscripts and has asked me. I cannot say no. This means that you will have to carry on, on your own. Of course, I shall come to see once a fortnight, but there is no alternative.

After two years, the maximum time for a Wellcome Fellowship, I had read all the 6,500 pages of Leonardo in the original. I had become one of six persons in the world to do so. But I had written almost nothing. My friends at the Wellcome, had been conscious of the situation and had suggested two alternatives. One was a Leonardo da Vinci scholarship in Florence by a Foundation of the Giunti Printing Press. Another was a Stipendium at the Herzog August Bibliothek in Wolfenbüttel. Both were granted me. Initially, I chose Florence, but when I went to Florence I was treated badly and decided to choose a more stable basis.

Wolfenbüttel (1977-1984)

Wolfenbüttel was an unlikely place for Leonardo Studies. They had a few but by no means all of the facsimile editions. But there was a close relationship with Göttingen. As a result, almost by decree, the Director of the Herzog August Bibliothek, Professor Paul Raabe, requested the head of the Library at Göttingen for an inter-library loan that lasted seven years. As a result, I had the equivalent of over \$200,000 worth of facsimiles in a private office all this time. From this resulted three volumes on Leonardo's Perspective, Optics, and Astronomy. There were plans to publish volume 1 in Italy but these were thwarted by an eminent colleague who had worked in Los Angeles. Then one day I was at lunch with the professor of Art History at Braunschweig, Professor Martin Gosebruch who effectively ordered the head of the Deutscher Kunstverlag. To publish volume 1. The publication appeared in 1986.

On Tuesdays, I would go to Göttingen to pursue work on the perspective bibliography. The librarians there were exemplary. Ever so slowly, they introduced me the mysteries of higher bibliography, of national catalogues, book catalogues, special subject catalogues and the like. In the final year at Wolfenbüttel, I was given a Lehrauftrag at Göttingen. One of my colleagues was Professor Françoise Forster Hahn. Her husband, Professor Kurt Forster was named the head of Getty Institute. This was one of the inputs that led me to be invited as one of the first ten fellows. Another input came from Marcus McCarrison, of the Research Libraries Group, who became aware of my new vision for bibliography. A third input came from Lynn White Jr., who was made aware of my vision of a new approach to the history of science.

Toronto (1984-1998)

Out of the blue, I was invited to apply for a position in Toronto at the Institute for History and Philosophy of Science and Technology (IHPST). Professor Ian Hacking had read an article in a 1981 world conference on Leonardo. I was given the job. After a year I was invited to become Canada's first Getty Scholar. Following advice, I delayed by a year. Then I went.

Santa Monica (1986-1987)

In a sense, the Getty was an equivalent of paradise on earth. There were ten of us. I was the youngest. The main purpose was to take the 15,000 titles on file cards and enter them into a computer. There was a data entry person to do this. Alas, American inputters are utterly unfamiliar with foreign languages so an average of 2 hours was required each day to correct the typos committed by the data entry person. For the rest of the time, I began writing an introduction to the primary and secondary sources of perspective.

When I returned to Toronto the climate had changed. The only question about my year in Santa Monica was: How was the beach? The retirement of Professor Stillman Drake, meant that there was a vacant chair. It was given to charming candidate who assured students that they had no need of Latin because everything had been translated. As a consolation prize, I was given a Canada Research Fellowship, which was supposed to result in a full-time position, but did not.

My teaching continued in the field of Renaissance science. My research interests widened. My cocktail party answer to what do you do was now that I worked on 1 man, 1 word and 1 object. The man was Leonardo da Vinci, about whom I wrote a small book on *Leonardo's Method*. The word was perspective and the object was the proportional compass and/or sector. The vision was to write a book on the *Mastery of Quantity*, but somehow this never materialized. What did happen however was a collection of proportional compasses and sectors from throughout Europe. As the devices that served as tools for universal measurement, these were effectively the equivalents of computers in their day.

Meanwhile, there was a new passion, or rather one that had been long in the forming. In 1961, I had a dream about computers integrating the whole of knowledge.² In 1981, a three-month trip around the Mediterranean in a jeep with a friend had transformed my understanding of the world and history. At school, I had learned about the Coliseum in Rome. No one had told me about the Coliseums in El Djem in Tunisia, Arles in France, or Pula in Croatia. I began to imagine a new kind of cartography: if I choose coliseum, I get not only the version in Rome but all 26 of the closely related "copies" throughout the empire and the over 200 examples in a looser sense spread throughout the Roman Empire. When I returned from the trip in 1981, I wrote a paper about a new approach to knowledge: a vision of a new kind of electronic encyclopaedia of all knowledge.

System for Universal Media Searching (1992-)

When I came back to Toronto in 1984 I acquired my first computer. During the year at the Getty, with the help of Dr. Richard Dolen, I made first steps towards a systematic bibliography of perspective. In the next years, I developed a vision for a System for Universal Media Searching (SUMS). A group of gifted high school students was formed at the coachhouse of the McLuhan Program. A corporation was founded and a demo. The demo attracted local attention, was chosen as a G7 project representing Canada – the only one in the world involving students. When the G7 established 11 visionary projects, SUMS was accepted as part of four

examples for project 5: Multimedia Access to World Cultural Heritage. We represented Canada in Brussels (1994), Halifax (1994) and Midrand (1995).

I wrote a draft on how SUMS could lead to a System for Universal Multi- Media Access (SUMMA, 1996). As an informal advisor to the head of advanced networks at Nortel and to the President of Bell Medialinks, I had the privilege of travelling the world to major conferences such as Internet Society and WWW. In the process, I also had the privilege of meeting most of the pioneers of the internet: Doug Engelbart, Ted Nelson, Robert Kahn, Vint Cerf, Louis Pouzin, Leonard Kleinrock, Tim Berners Lee, Robert Cailliau etc.

Maastricht (1998 -2017)

In 1994, a VPRO documentary on the Information Highway had led to an 8-minute clip on my project. This had led to an internship from a student in Maastricht. The following year two students came. These were so excited that they approached their Dean to invite me to the Netherlands. A consortium of 2 universities and 2 polytechnics was established. Meanwhile, because of my G7 connections, I had been asked by the European Union to give them advice on their Memorandum of Understanding (MOU) for Multimedia Access to Europe's Cultural Heritage. There arose a vision of a network of centres of excellence in which my new institute in Maastricht would play a lead role.

For the Internet Society meeting in Yokohama (August 2000), I wrote the longest paper in their history: over 200 pages. This eventually became my book on *Understanding New Media* (2006, 650 pp.), which attempted to give a new vision of how computers could affect society as a whole. While most persons were distracted by the latest developments of the day, the book argued that the full implications of computing had hardly begun.

Universal Library (1998-)

The idea of universal access to all knowledge had been clear in the dream of 1961 and my first essay on the topic twenty years later (1981). The G7 pilot projects, especially 4 and 5 put the vision of a *Bibliotheca Universalis* back on the table. Alas, a pilot project to harmonise the author catalogues of five national libraries failed. When I created E-Culture Net, the original vision took centre stage. Humbled by the failure of the G7 attempt we decided it should start at a European level as a Distributed European Electronic Resource (DEER) and then grow incrementally to become a World Online Networked Electronic Resource (WONDER). Alas, the local politics in Maastricht destroyed my base. Then Google had the hubris of planning to do all this privately. An outraged director of the Bibliothèque Nationale wrote to the President of France, who wrote a formal letter to the European Union, which replied with a plan to create The European Library, which by now integrates the resources of 44 national libraries. It has many shortcomings but it is well funded, growing and has a sufficient political base to have hopes of long term success. What had begun as my dream was now a project of others in which I was not even a footnote. Eight years later I began to reflect on what was missing (see below).

(Western) Picture Making (2000-2004)

In 2000, I was approached by Professor Jacques Poulain, about becoming a founding member of new European University of Culture –which failed to happen. It was clear that a traditional Eurocentric approach would lead us to be dismissed by great cultures such as India and China. So, I embarked on a project called New Models of Culture: how could one give due credit to Western achievements, while simultaneously acknowledging the great achievements of India,

China and other old cultures. This led to 35 lectures recorded at the National Institute of Informatics (NII), Tokyo. There was a simple question. There is art in every culture of the world. Why is it that Western art has led to such a preponderance of image making? Why are there so many more art museums in the West than the East, and often more museums generally?

There was an almost simple answer. Many cultures had only one goal of art: e.g. the aboriginals of North America and Australia had only connecting; some cultures had ordering (decorative arts). Some preferred time-bound performance arts such as music, dance and theatre. The West included both time-bound performance arts and time-less “fine arts” such as sculpture and painting. The West developed six goals of art. Of these, perhaps the most important was perhaps matching, not simply because of its commitment to copy the physical world, but rather because it extended into a commitment of visualizing realistically the stories of manuscripts of books ranging from mythological stories of Greek and Roman gods to the Bible and lives of the saints. The 35 lectures offered a first glimpse into a new history of art, which acknowledged the greatness of Hindu and Chinese art and yet explained why Western art deserved especial study. Professor Andres generously extended an invitation for a second series. A decade passed before I managed to prepare this (see below) and a date for holding the lectures has yet to be fixed.

Meanwhile, in Maastricht, there were winds of change. In 2002, there was a new Dean and new President. The new dean was wonderfully candid. He did not like McLuhan nor did he like me. He was going to close the Institute. I pointed out that I had tenure. That would not pose a problem he promised. I defended the case in court and lost. By 2004, I had lost my institute, my tenured position with effectively no prospect of a new job. For a decade, I wrote a weekly application for some new job. Of these 520 applications, hardly any led to an interview and none led to a new job. In the eyes of the career world, my life was finished.

Alphabets of Life (2004-2014)

For about a year, I sat feeling very sorry for myself. Gradually it became clear that there was danger of simply becoming bitter and dying a premature death as a result. I chose another option. I had time, so I decided to study the history of alphabets because they were a key to understanding different cultures. The project took 10 years and resulted in a 2,000 page book.

At the outset, it began as a simple compilation exercise. Gradually unexpected patterns began to appear. Alphabets had not begun with Phoenician or Hebrew. There were two much older sources: one Slavic, the other Indian. The Indian might have had Northern roots in the Altai or possibly even in Siberia. This led via the Indus valley to Sanskrit which, contrary to some claims, was the source of at least 100 alphabets in Nepal and India alone. With the choice of Brahmi as the official script by Ashoka, Sanskrit had a far greater sphere of influence, not just with the Indo-European family of languages, but to at least seven other language families affecting the whole of South-East Asia.

In my early studies, I had been taught that meaning was linked with words and thus to study meaning meant going to dictionaries. The study of alphabets led to new insights. First, there was a micro-history of meaning, which centred on letters. Each letter had its own meaning verbally and also gematrically, i.e. a numerical value. In some cultures, this gematric value was further linked with geometrical shapes. Moreover, these meanings of individual letters were not isolated. The sequence of alphabet letters often told a story, of creation, or, more significantly, of the beginnings of life. So, alphabets were not just expressions of life. They were alphabets of life in that they told the story of how human life had come into being. Friends

urged me to make this message more accessible. So, I prepared 26 lectures reflecting an introduction, the 12 chapters and 13 appendices of the book. Jaya Luintel, the wife of my friend Madhu Acharya graciously invited me to give the lectures in Kathmandu, In April of 2017, they were recorded.

Implicit in the alphabet studies, was a whole new approach to truth. If meaning was just in words then anyone who knew the basic meanings of words could understand the meaning of a text. Fundamentalists in the Christian tradition were often quick in assuming that they knew the meanings of passages and even quicker in judging others as a consequence of their readings.

Traditionally, scholars had recognized the possibility of different levels of interpretation. Dante had described four. Rumi had three gates of speech (true, necessary, kind)³ and four levels of tawhid (interpretation).⁴ In the Hebrew tradition, the number of interpretations sometimes increased to 32. However, the new studies pointed to something different: they meant that the truth of sacred texts now had a series of layers. One layer was at the level of words. Another layer was at the level of letters, where the basic meanings could be completely different. Then there was a level where the numerical meaning of individual letters and words reflected another reality. This numerical reality was, in turn, susceptible to geometrical versions such that numbers 19, 37 and 73 were, for instance, connected with hexagram stars and the so-called creation hologram. This redefined the challenges facing a proposed new encyclopaedia of knowledge. It needed multiple layers. And, in the Jewish tradition, where there no less than 9 gematria systems, there needed to be multiple values for the same letters and numbers.

Universal Library II (2011-)

The rise of The European Library (TEL) was paralleled by other monumental projects such as Worldcat, which now includes over 2 billion records from over 10,000 libraries. In light of these proportions, it seemed I had nothing left to say. But as the years passed and I attempted to use these tools which promised to have solved everything I continually found problems and lacunae. In the case of a book with 30 editions, Worldcat often had only a few. In the case of an obscure author, there were different titles if one typed the first name as a single letter such as A. or typed the full name, e.g. Angelo.

So, I decided that my role as Socrates was not yet over. In 2009, I gave an opening keynote on the problems at EVA London. Beginning in 2011, I gave opening keynotes at Professor Ficarra's Human-Computer Interaction, Tourism and Cultural Heritage (HCITOH) conferences. These explored the challenges involved. Acknowledging that truth was multiple and problematic – seldom pure and never simple as Oscar Wilde put it – did not mean a capitulation to relativism. It meant an ever-greater need to document the means of knowledge, of which India had documented ten.

This was the topic of a keynote in Turin (2016). The Renaissance had called for sources (*fontes*). The new media called for including types of sources. A World Wide Web without these was open to being manipulated; to confections between real news and fake news, to confusions between truth and rumour/disinformation/propaganda and ultimately between the universe of the real world and metaverses of simulated worlds. The answer lies not in forbidding imagination, fiction, phantasy and simulation. Indeed, when we are playing there is no problem in letting the real and imaginary intersect. At the same time, in everyday life, the challenge is to develop tools, which will help us to distinguish clearly between which parts are real and

which are fictive, else we risk being played by invisible players with no way of identifying and defending out reality.

As the technical hurdles of actually creating such tools became ever more formidable and seemingly out of reach, there was, as so often happens, an unexpected development. An English friend, who had originally been intrigued by my perspective writings, Dr. Alan Radley decided to take up these problems in a book, *Self as Computer. Blueprints, Visions and Dreams for Technopia* (2015), which he dedicated to yours truly. In 2016, he gave a keynote in Turin about a new universal library on a much grander scale than Paul Otlet's *Machine à penser le monde*, TEL, or even Worldcat. Once again, an idea I had tried to articulate was being taken over by someone much more technically gifted than myself.

On bad days, I had always pondered that almost all my ventures had ended in failure in the sense of me not carrying them to completion. Perhaps there was a more optimistic interpretation. Real failure is when an inventor is unable to achieve it and the idea dies with its inventor. The inventor's success is ultimately unimportant. The beginning of real success is when the idea, like a seed, finds a fertile ground, or person in which/whom it can develop. Greatness in a man, said Nelson Mandela, is not in the falling, but in the getting up. Perhaps, greatness in an idea, is not in failing, but in managing each time to find new fans, donors, champions, who will carry it to levels where it makes a difference.

Individuals are a key to everything. But as long as individuals are fixated on their own personal and often selfish needs, they are of little interest in the realm of world ideas and world views. Only when a person's ego has died to the extent that their personal will takes a backseat with respect to grander visions and goals of humanity, does the individual become worthy of interest to those outside his immediate family and close circle of friends.

Picture Making II (2014-2016)

Ever since the Tokyo lectures of 2004, my friend and colleague, Professor Andres had encouraged me to prepare a second series. Eight years passed before I arrived at an answer. Rather than providing a list of new cases, which would effectively double the examples, a new tack offered itself: to begin with key themes and numbers and compare how different cultures deal with them. Various problems of timing have meant that they have yet to be given but a new set of 35 lectures is ready.

Perspective Studies II (2016-)

In 1995, my failure to receive a tenured position led me to take a position in industry to pay the bills. The good news was that it offered many new stimuli. The bad news was that there was no time for my academic interests in perspective or the proportional compass. In 1998, when I was made founding Scientific Director of the Maastricht McLuhan Institute (MMI), the excitement continued, but so did the distractions. In 2004, when the institute was closed the excitement and distractions faded. For a time, so too did all enthusiasm to continue on projects associated with my failure. For a decade, *Alphabets of Life* offered a wonderful distraction that opened up many news avenues of awareness. The next two years were spent preparing the lectures for Picture Making II.

Then there was a wonderful visit to Melbourne in November 2016, which gave me a new lease on life. It was as if I had been reborn. Close friends had been dying. Now for the first time in

five years there was a new friend with whom I could speak honestly. My heart soared. When I returned I looked around and saw a pile of unfinished homework in the form of the *Bibliography on Perspective*. A visit by Alan Radley led him to offer help in publishing the volumes while a local “fan,” Bernd Alexander generously offered to help with scanning images. I decided to take my homework seriously

It was only as I set about to begin the task that I became aware of the realities: it had effectively been 25 years since I worked seriously on the project. The software which had been developed no longer worked properly. There had been three new bibliographies. These posed no serious problem. But there were three great surprises. First, when I consulted The European Library catalogue a search for three terms, linear perspective, perspective and perspectives resulted in 1,580; 260,083; 296,683 titles respectively. A similar search in Worldcat, yielded much larger numbers: it entails over 2 billion titles 209,564; 2,280,617; 2,297,432 titles respectively. Vagnetti’s bibliography had 1,252 titles. My bibliography, when I had last worked on it in 2004, had 8,208 sources. Now there were over 2 million which far exceeded the scope of a straightforward bibliography. This called into question whether completing the bibliography would even be possible.

The second surprise was that, on closer study, this explosion has been largely been in the past 25 years when I was distracted by other things. The third surprise was to learn the cause. In 1996, an American student, Paul Debevec, had written a PhD dissertation involving reflection mapping. On the surface, it was merely a more efficient way of creating perspectival views. In fact, it meant that perspective which had been used for matching the universe could now be used equally for cross-matching with the simulated world of a metaverse. An immediate impact had been a great surge in computer generated images such as the bullet scene in the *Matrix* (1999) and newer films such as *Avatar* (2009).

A more important consequence, was that it added a seventh goal to Western image making: cross-matching. To be sure there had been attempts at virtual and augmented reality dating back to the 1960s. But the new techniques introduced a possibility of achieving this on an unprecedented scale. Debevec’s two videos *The Campanile Movie* (1997) and *Fiat Lux* (1999) heralded a new era. Different in this new era, was that the traditional matching of the universe was now in competition with cross-matching with a metaverse. The goal of conquering and copying reality, now pitted reality against virtual reality, with some players intent on deliberately confusing the boundaries between the two. Perspective, which had been the prime technique in the Western championing of truth and objectivity, was now in danger of being used by the side of illusion, trickery and deceit. It was no longer a question of defending perspective per se; but rather in insisting on those forms which fostered truth.

One day as I reflecting on my life recently, I looked afresh at my work. In the 1990s, I had said I studied 1 man, 1 word, 1 object. Since then there had been a proliferation of subjects from perspective, Leonardo, proportional compass to new media, a universal library, art and alphabets, but the connecting thread behind them all was a quest for truth: What is truth? What tools can help us to record, represent and conserve it? Many of my projects had failed. My attempts at being utterly truthful had just cost me my latest friend, which had led me to the brink of utter despair. If one is rejected because of truth, where can one turn? The answer came from the deepest depths of my being. Only an unfailing devotion to truth, could save me from worse fates: becoming less honest, less human.

Many of my friends were dying but while there was life in me I must be unflinching in doing my homework. In my 20s, my mystic friends had refused to initiate me because they said I had been sent back to earth for a purpose. I had been frustrated with them at the time. I never thought of myself as an epic figure, a super-hero or even a hero. Now I realized that my version of “above all to thine own self be true” entailed a study of and defence of truth, even if it meant losing the person who seemed most dear to me but who admitted to having chosen “grace at the expense of truth.” The only way forward was to follow the path of Rumi, to become the fire that removes itself from the cookpot. Hereby, the cookpot could insist that they had rejected me and I could get on with a job that was much bigger than my ego or my person. Mortals would say it was about saving the universe. Immortals would say it was learning to walk in the path toward/of God. Personally, I had finally realized that I have a task in life that is more important than a day job: truth which leads to God. Understanding this is a prerequisite for a true friend.

Notes

¹ Reading Room:

https://upload.wikimedia.org/wikipedia/commons/c/c5/British_Museum_Reading_Room_Panorama_Feb_2006.jpg

² How it all began: http://sumscorp.com/sums/how_it_all_began/

³ Rumi: <http://www.philpercs.com/2015/05/the-three-gates-of-speech.html>

⁴ Tawhid:

<https://books.google.nl/books?id=7vSsAgAAQBAJ&pg=PA85&lpg=PA85&dq=rumi+four+levels+of+scripture&source=bl&ots=IJ3EJq07tx&sig=5NYTxYcLeOlzxiDXvzsSxIR83xQ&hl=nl&sa=X&ved=0ahUKewjh4ozh0PHUAhXIKlAKHYN2B-kQ6AEIZjAJ#v=onepage&q=rumi%20four%20levels%20of%20scripture&f=false>