GENERAL ARTICLE

A Film on Leonardo da Vinci by Luciano Emmer

Michele Emmer

ABSTRACT

Leonardo da Vinci probably did not consider the possibility of realizing images with real movement. Many centuries later, however, the author's father, Luciano Emmer, had the idea of reinterpreting the images of the famous artist and scientist using the technique of cinema.

MATH AND THE RENAISSANCE

Leonardo da Vinci was an extraordinary scientist as well as a great artist. He was very attracted by images and had a visual mind; the scientifically motivated pictures he drew are in many cases of great artistic value. Many centuries after Leonardo's time, my father, Luciano Emmer, a famous Italian film-maker, had the idea, probably unimagined by the artist, of reinterpreting these images using the technique of cinema.

It is almost impossible to tell the difference between Leonardo's artistic drawings and his scientific ones. I recall a well-known example of Leonardo's mathematical drawings: those he made for Luca Pacioli's book *De Divina Proportione*.

Between 1482 and 1492, Piero della Francesca wrote the famous treatise *De quinque corporibus regularibus*, on the five regular solids of three-dimensional Euclidean space, also called Platonic Solids, as Plato was the first to describe them in his dialogue *Timaeus*.

> *Multa sunt corpora lateribus constituta, quae in sperico corpore locari queunt, ita ut eorum anguli sperae superficiem omnes contingunt. Verum quinque ex eis tantummodo sunt regularia: hoc est, quae aequales bases habent et latera* [1–3].
>
> (Many are the solids delimitated by sides, that can be inserted inside a spherical body in such a way that all their angles touch the surface of the sphere. Only five of them are regular, that is those who had bases and sides all equal.)

Thus begins the treatise describing the geometrical properties and the perspective rendering of the five solids and other semi-regular solids, the so-called Archimedean solids of Euclidean space.

Piero della Francesca used the already-known *troncatura* and *stellatura* methods, that is, the truncation of the vertices of the regular solids and the stellation of the faces, placing regular pyramids on the faces, introducing the names *abscissum*, *vacuum, solidum, elevatum,* etc.

In the Renaissance, the study of polyhedra was closely linked to their perspective representation and in turn closely linked to the fundamental problem of architecture.

The mathematician Luca Pacioli, who was probably a student of Piero della Francesca, incorporated the latter's treatise on regular solids in its entirety in his famous book *De Divina Proportione*, printed in Venice in 1509. Vasari subsequently accused Pacioli of plagiarism for this reason. Vasari observed, in his famous *Vite* (Lives), that one of the worst things that can happen to a scholar is to work and study for the gratification of others. "He who had apprised all he knew from Piero, tried to cancel his name, publishing under his name, fra' Luca di Borgo [i.e. Luca Pacioli] all the works of this good old man" [4].

The volume *De Divina Proportione* owes much of its fame to the fact that the 60 figures of regular, semi-regular and star-shaped polyhedra were "*facte e formate per quella ineffabile mano sinistra a tutte discipline mathematici accomodatissima del principe oggi fra i mortali, pro prima fiorentino, Leonardo da Vinci*" [5] (made by the incredible left hand, which knows all mathematical disciplines, of the prince of all mortals, Florentine-born Leonardo da Vinci).

Piero della Francesca painted between 1472 and 1474 a portrait of Luca Pacioli as Saint Peter in the painting entitled *Madonna dell'ovo* (The Madonna with the Egg, now in the Pinacoteca of Brera in Milan); another portrait of Luca was probably made during the years 1498–1500 by Jacopo de' Barbari (now in the Museum of Capodimonte in Naples). This latter painting is particularly interesting because in the upper-left corner there is depicted a model, probably in glass, of a semi-regular solid: a rhombicuboctahedron, that corresponds to Table XXXV of *De Divina Proportione,* entitled *Vigintisex basium planum solidum* (Fig. 1).

Another solid, a dodecahedron, that is, a *Duodecedron planum solidum*, is depicted in the lower-right corner. Pacioli's left hand points in the painting to a page of Euclid's *Elements*.

Paolo Uccello was surely one of the artists most interested by geometrical forms during the Renaissance. For this reason Vasari described him as being more a mathematician than an artist:

> Wherefore the sculptor Donatello, who was very much his friend, said to him very often—when Paolo showed him *mazzocchi* with pointed ornaments, and squares drawn in perspective from diverse aspects; spheres with seventy-two diamond-shaped facets, with wood-shavings [*sic*] round sticks on each facet; and other fantastic devices on which he spent and wasted his time—"Ah, Paolo, this perspective of yours makes you abandon the substance for the shadow; these are things that are only useful to men who work at the inlaying of wood, seeing that they fill their borders with chips and shavings, with spirals both round and square, and with other similar things" [6] (Fig. 2).

The *mazzocchio* [7] was a form of hat very much in vogue at that time. Many characters in the works of several Renaissance

Michele Emmer (mathematician), Dipartimento di Matematica G. Castelnuovo, Università di Roma "La Sapienza," Piazzale A. Moro 5, 00185 Rome, Italy. E-mail: <emmer@mat.uniroma1.it>.

See <www.mitpressjournals.org/toc/leon/42/5> for supplemental files related to this article.

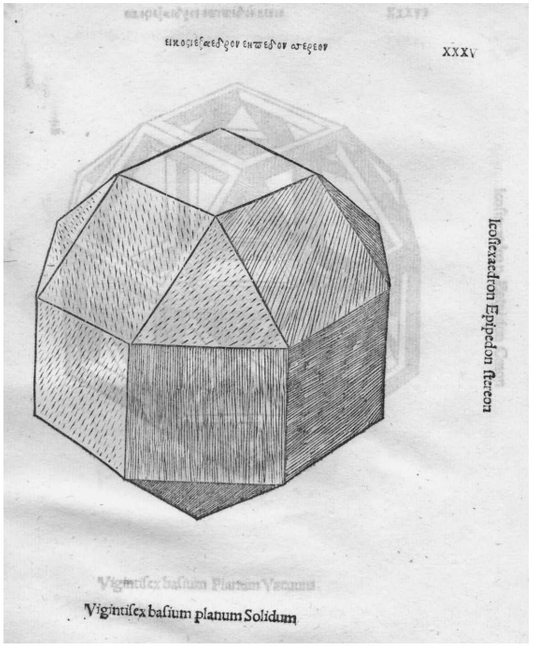


Fig. 1. Leonardo da Vinci, ***Plate XXXV, Vigintisex Basium Planum Solidum*, from Luca Pacioli's *De Divina Proportionie*, 1509.**

artists were depicted with a hat in this shape. Those who were able to represent a *mazzocchio* in perspective were considered masters of the art of perspective. Even Leonardo da Vinci, as well as Piero della Francesca and Paolo Uccello, made a few drawings of *mazzocchi*. It is likely that these drawings, only a few of which have survived, served as models for the artists of intarsia. The art of intarsia was very popular at the time.

Leonardo's Drawings for Pacioli's Book

Regarding Leonardo's drawings for Pacioli's book, it is interesting to note a problem that is significant from both the artistic and the scientific perspectives. It is believed that Kepler was the first to observe that regular solids appear in dual form. In his 1619 treatise *Harmonices mundi,* Kepler described the solid he called *stellarum duodecim planarum pentagonicarum*: "*Habet hoc coniugium et stellam solidam, cujus genesis est ex continuatione quinorum planorum dodecaedri, ad concursum omnium in puncto unico*" (This marriage includes star-shaped solids generated by a continuation of the five planes of the dodecahedron until they meet in a single point) [8] (Fig. 3).

The solid described by Kepler is a star-shaped dodecahedron. The discovery of this solid has been attributed to him, and it derives its name from the shape created by standing a regular pyramid on each of its faces. Also in 1619, Kepler published the first perspective representation of two regular star-shaped dodecahedra. One of these shapes was realized in mosaic form on the floor of Saint Marc's Basilica in Venice. It is attributed to Uccello, who probably made it during his stay in Venice between 1425 and 1430, which is much earlier than the date of the official mathematical discovery. This unusual episode reflects the fact that many artists at that time were better trained in mathematics than *official* mathematicians.

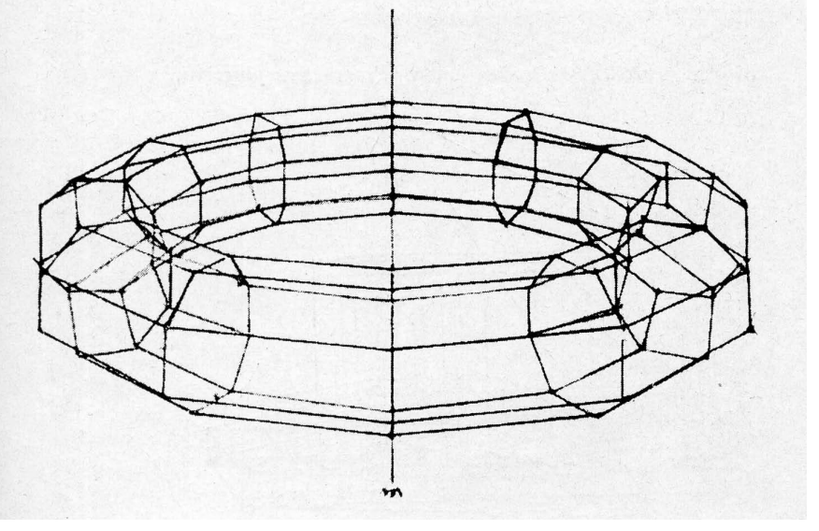
In his *Harmonices mundi,* Kepler studied in depth the properties of polyhedra, proving that there exist only 13 regular solids. He also constructed the famous *stella octangula*, already contained in *De Divina Proportione*, where Luca Pacioli had named it *octaedron elevatum solidum*. The *stella octangula* is obtained by combining two tetrahedra. Kepler, who attributed a sex to each solid, named it hermaphrodite [9].

Filming

In 1982 I was making my film *Platonic Solids* [10] in the series Art and Mathematics and of course I wanted to film the drawings of Leonardo in Pacioli's book. I was very lucky to receive the kind permission of the Biblioteca Ambrosiana in Milan to borrow the original copy for the filming (naturally without leaving the Biblioteca). I prepared a small room inside the Biblioteca with the lights and all the technical equipment needed and started filming. I used only silk gloves to handle the volume and used the lights strictly for the time of filming in order not to warm up the book's precious pages. I was able to film all the drawings of Leonardo; in the process of editing, I inserted a dozen of them into the final film.

While filming, I had in mind the film that my father had made on Leonardo da Vinci 30 years before. My father started his activity as a film-maker in the 1930s. He began by making documentaries on art; most of them became famous for their employment of the new techniques used in filming after World War II. At that time, the standard model for a documentary on art was a film in which the words of an art historian commenting on the topic were the most important part of the film, more important even than the images. The ideal was a sort of filmed conversation. On the contrary, my father,

Fig. 2. Piero della Francesca, *Mazzocchio.*



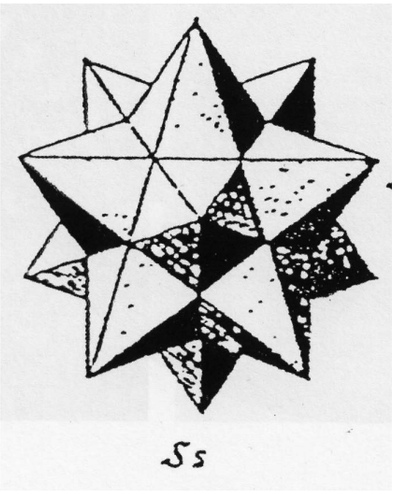


Fig. 3. J. Kepler, *Star-shaped Dodecahedron*, from *Harmonices mundi*, 1619.

while making his film on the Cappella degli Scrovegni in Padova, had the idea to use the images created by Giotto as scenes for the film, constructing a sort of animation and dramatization of the story as if the pictures had been created for the film by the artist, giving less importance to the commentaries and using almost only music for the audio.

The result was as if the film had been realized in the presence of Giotto. One scene in particular became very famous: Giotto painted in one of his representations of the history of Christ several angels in various positions of flight. My father had the idea to use the different angels as if they were different positions of a single angel. In this way he created an animation using the very images of Giotto [11] (Fig. 4).

After the war, my father started making fiction films. The first was *Domenica d'agosto* (A Sunday in August), in which a very young Marcello Mastroianni appeared for the first time [12]. A few years later, in Paris, he made—again with Mastroianni and with a very young Yves Montand—the film *Parigi è sempre Parigi* (Paris Is Always Paris) [13]. While making this film, he was asked to realize an art documentary on Leonardo da Vinci.

The Leonardo project was generated by the decision of Lazar Lotar Kipris to create, together with some businessmen from the U.S.A., a company to realize art documentaries. The company decided to buy Luciano Emmer's already extant films on Bosch, Carpaccio and Goya. The name of the company was Pictura Film, as the art historian Lauro Venturi recalled in a volume printed on the occasion of the Torino Film Festival of 2004. Luciano Emmer was the guest of honor of that festival, with a retrospective presented of all his films and documentaries. In the volume dedicated to him, filmmakers, actors, writers and art historians were asked to write on their connections with Emmer [14]. I also wrote a short text on my experience of being an actor, at the age of 8, in a film by my father [15]. The idea of the founders of the U.S. company was to combine several Emmer documentaries on art into one film of an hour and a half. The title for the final version was *Pictura: Adventure in Art*. In order to connect all six films inserted into the longer version, a short scene to be interspersed through the film was shot for the occasion featuring Vincent Price and students sitting on the grass of the University of California at Berkeley campus. In the film Price said: "You are starting a trip, a trip strange and exciting to the far away sites of human imagination. You are entering into the minds of the greatest artists in the world. You will feel their emotions."

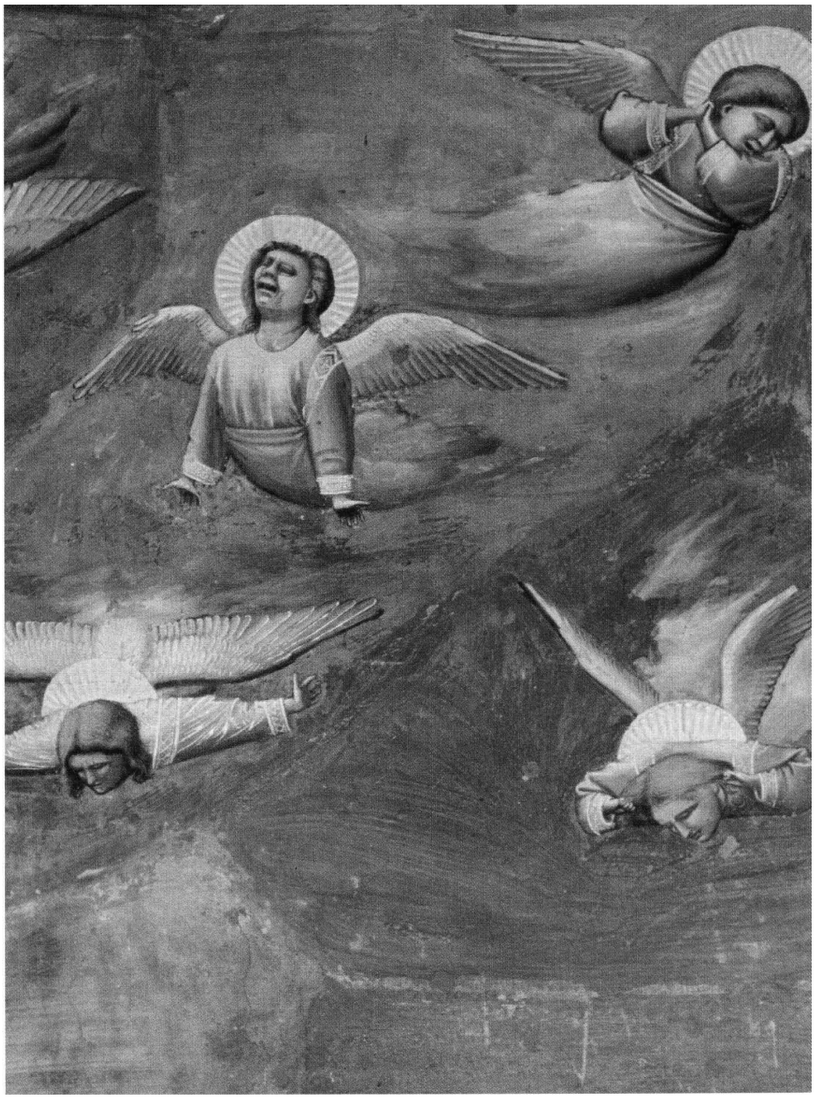
The film started with Luciano Emmer's *Bosch*, followed by a comment from one of the students, who said: "These Renaissance painters were very troubled. Blood. . . . Battles. . . . All like that."

Price replied:

> Take Carpaccio, for example, the Venetian painter. Bosch and he were both religious painters, but the resemblance ends here. Bosch was violent. Carpaccio was calm. Bosch depicted terrible and horrible enigmas. Carpaccio told very quiet stories in his works.
>
> There is one painting, The Legend of Saint Ursula, who lived one thousand years before him. Your guide is the voice of Gregory Peck. . . .

After the film on Bosch, there followed those on Carpaccio and Goya, all directed by Emmer; then *Toulouse-*

Fig. 4. Giotto, *Lamento per il Cristo morto*, Cappella degli Scrovegni, Padoa, detail, 1303–1305.



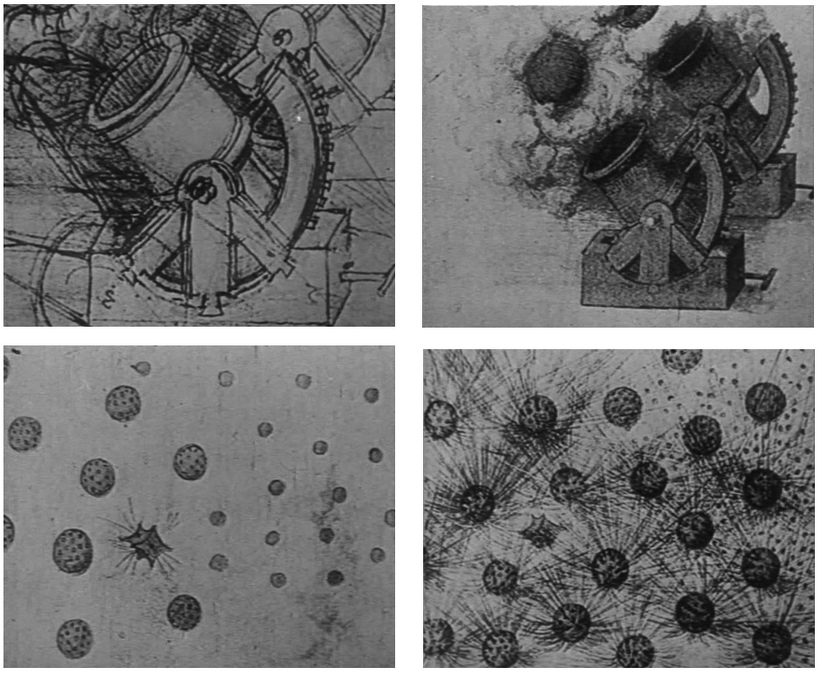


Fig. 5. Frames from the film *Leonardo da Vinci* (© Luciano Emmer), showing his drawings of *"macchine da guerra"* from the *Codex Atlanticus*.

Lautrec by Robert Hessens, narrated by Lilli Palmer; *Gauguin* by Alain Resnais, with the voice of Martin Gable; and finally the film *Grant Wood,* narrated by Henry Fonda.

THE FILM ON LEONARDO DA VINCI

Due to the great success of the film, the U.S. producers met with Venturi to realize a new film on Leonardo. Venturi recalled having suggested Luciano Emmer as director [16]. On 1 August 1951, Venturi wrote to Emmer. My father had just completed the filming of *Parigi è sempre Parigi.* In September Venturi went to the IBM Museum in Poughkeepsie, NY, to film reconstructions of Leonardo's *macchine* (mechanical designs) to be included in the film. In November Venturi and Leonid Kipnis signed an agreement for the production of a film directed by Luciano Emmer on Leonardo da Vinci.

Venturi remembers:

> The greater part of the filming and the lab work took place in Paris, at the Arcady Studio. The script was written by Emmer and myself. In Italy we had to film the paintings and other original materials like the drawings, should they be necessary for the film [17].

The agreement specified that the first edit of the film had to be ready by 1 January 1952 at the latest. The structure of the film that Venturi and Luciano Emmer had in mind, as taken from the storyboard, was as follows:

> The life of Leonardo, the hills of Vinci, the castle, the landscape from the house of Leonardo. The Landscape. The river Arno. From the water emerges the *Ponte Vecchio* [Old Bridge], Brunelleschi's Dome, San Lorenzo, Santo Spirito, the Annunziata, the convent of San Marco. Verrochio: the angel of the *Annunciation.* Milan: Castello Sforzesco, *The Last Supper*, the Atlantic Codex. Among the drawings, conclusion on the equestrian red monument. The statue of Colleoni on a horse in Venice. Water. From the water of the Tiber to the Angel on the top of Castel Sant'Angelo. Details of the castle. The small palace of the Belvedere (a panoramic on the gardens). Panoramic from the hands to the eyes of *Mona Lisa.* Tracking shot towards the eyes. The landscape on the left of the painting. The water of the Loire. Panoramic towards the upper part on the Castle of Amboise. The house of Leonardo at Clos Lucé. Panoramic along the Loire dissolving on the beard of the self-portrait, tracking shot towards the eyes, then dissolving view.

This was the end of the first part of the script/story board, followed by another five parts. The film ended by returning to Leonardo's self-portrait, moving from the beard to the eyes. *The end.*

The most important part of the film were the animations of drawings based on the original drawings of Leonardo, such as the ones for the bells, or the movement of the air, the animated flight of the birds, the flying man, the parachute, etc. (Fig. 5).

In order to present the Leonardo drawings, the filmmakers used reproductions on which a transparent paper was superimposed, with, as Venturi remembers, the subjects to be filmed drawn in black and the camera movements and the special effects to be realized for each subject in red.

The filming of the animations was realized at the Arcady Studio in Paris, located at Boulevard Saint-Michel 185, 5 minutes' walk from the famous hotel Lutetia, where my father stayed during the filming of *Parigi è sempre Parigi.* My mother, my sister and I all lived there for 6 months.

The U.S. producers were well satisfied with the news on the film that reached them, and in a letter to Venturi, Herman Starr of Pictura film wrote: "I think *Leonardo* will be our first real film." The filming of the works of Leonardo in Italy was to be completed in 1952. It was necessary to conceive the music. For this the composer Roman Vlad was chosen. The voice of the actor Albert Dekker was chosen for the U.S. version of the film. The film was presented to the Venice Film Festival in 1952 and was awarded the *Leone d'oro* (Golden Lion) for the best documentary [18].

It was subsequently shown in New York during a special week of Italian films. Bosley Crowther of *The New York Times* commented on 21 November 1952:

> The film *Leonardo da Vinci*, which came to the Guild theatre yesterday trailing two or three notable citations for distinction in the documentary field, is an earnest endeavor to transmit an appreciation of the great man of the Renaissance through a shrewd cinematic presentation and discussion of some of his works. But the extent of its achievement is limited inevitably by the degree to which it is able to stimulate interest with pictures of pictures, music and spoken words. For the manifestations of Leonardo that are wholly depended upon here are some of his more familiar paintings and selected drawings from his voluminous notes. Except for some introductory glimpses, in color, of the places where Leonardo lived—his natal town of Vinci, Florence, Milan, Rome and Amboise—and a reverend examination of *The Last Supper* as a climax to the whole thing, the film is composed entirely of a straight photographic scan of Leonardo's prodigious notebooks, with looks at a few paintings thrown in.
>
> Now, there isn't the slightest question that the drawings and diagrams in Leonardo's notes are the full and exciting exemplification of a truly phenomenal mind. His detailed drawings of the human anatomy, of animals and birds, his diagrams of the eye and optics, were far in advance of his time. And his elaborate plans and visualizations for all sorts of instruments and machines—bridges and

cannons and airplanes—make for fascinating study, even today.

Nor is there any cause for criticism—indeed, there is only cause for praise—of the taste and intelligence with which the producers, Leonid Kipnis and Herman Starr, and the directors, Luciano Emmer and Lauro Venturi, have presented the material at hand. They have photographed the paintings and the pages with exquisite clarity and care. They have done a clever job of animating and superimposing certain of the drawings so as to further illuminate Leonardo's thoughts. And they have helpfully inserted, along with the original drawings, some photographs of the models that have been made of the fanciful inventions of Leonardo by International Business Machines.

The commentary by Marcel Brion, which Albert Dekker speaks, is a rich and poetic estimation of the quality of the great man's mind and soul, and the musical score of Roman Vlad is tasteful and articulate, being developed mainly through stringed instruments that suggest old worldliness but vitality. Through the music and commentary, a mood of serene profundity is imposed upon the engaging experience of leafing through Leonardo's notes.

But this, in the final analysis, is all that this effort represents—a look, via motion pictures, at Leonardo's paintings and notes. The force of the man's personality, or a relation of him to his times, such as was got in a similar film about Michelangelo, called *The Titan*, is not realized here. For pure intellectual stimulation, this lecture on Leonardo can't be beat. For emotional excitement and inspiration, it leaves something to be desired.

Final Comments

My father has continued to make films and documentaries on art and other topics, including the very famous *Picasso,* made with Pablo Picasso in 1953, also with the beautiful and intense music of Roman Vlad [19]. A record of the music was produced by Folkways Records with Picasso's *Three Dancers* on the cover [20].

Lauro Venturi also made a documentary on Chagall in 1964, which won an Oscar.

In some festivals for films on art, including that of the Centre Pompidou in Paris, there exists an Emmer Award for the best film. Luciano Emmer's latest fiction film, title *Le flame del Paradis* (The Flames of Paradise), was completed in 2006. Meanwhile he has realized several documentaries for the Italian state television network RAI in recent years, including one made for the reopening of the famous Galleria Borghese in Rome, titled *Bella di notte* (Belle at Night, recalling the famous film by Luis Buñuel) [21]. For his RAI documentaries, he put together images and frames from all his documentaries on art, making a sort of virtual Emmer Museum of art. Of course frames from the film on Leonardo were also included in all these films [22].

Leonardo probably did not think of the possibility of realizing images with real movement; many centuries later, my father had the idea of reinterpreting Leonardo's images using the technique of cinema—remaining, in my personal opinion, loyal to the spirit of Leonardo.

References

Unedited references as provided by author.

1. M.D. Davis, *Piero della Francesca's Mathematical Treatises. The "Trattato d'abaco" and "Libellus de quinque corporibus regularibus,"* Longo ed., Ravenna (1977).

2. J.V. Field, *Piero della Francesca. A Mathematician's Art*, Yale University Press, New Haven and London (2005).

3. M. Emmer, *Review of J.V. Field, Piero della Francesca. A Mathematician's Art*, Notices of the AMS, vol 54, n. 3 (March 2007) pp. 372–379.

4. G. Vasari, *Le vite de' più eccellenti Architetti, Pittori e Scultori italiani, da Cimabue insino a' tempi nostri descritti in lingua Toscana, da G. V. Pittore Aretino, con una sua utile e necessaria introduzione alle arti loro*, Florence (1550).

5. T.R. Castiglione, *Un prezioso manoscritto del Rinascimento in Svizzera*, Cenobio, vol. 3 (1954), pp. 271–288.

6. Vasari [4].

7. M. Emmer, *Mazzocchi da Firenze a Venezia*, in M. Emmer, ed., *Matematica e cultura 2008*, Springer Italia, Milano (2008), pp. 111–126.

8. J. Kepler, *Harmonices Mundi Libri V*, Linz (1619).

9. M. Emmer, *Visibili armonie. Arte cinema teatro matematica*, Bollati Boringhieri, Turin (2007). See the chapter *Forme dell'universo.*

10. M. Emmer, *Platonic Solids,* film and DVD in the series *Art and Mathematics*, 27 min, Film 7 and M. Emmer production, Rome (1982).

11. L. Emmer, director, *Racconto di un affresco*, with E. Gras and T. Grauding Emmer, Dolomiti Film Prod., Milan (1938). New edition with the music of R. Vlad (1946). New edition in color (2003).

12. L. Emmer, *Domenica d'agosto,* script F. Brusati, L. Emmer, G. Macchi, C. Zavattini, music R. Vlad, with M. Mastroianni, F. Interlenghi, A. Ninchi, M. Serato, Colonna Film Prod., Rome (1950).

13. L. Emmer, director, *Parigi è sempre Parigi*, script S. Amidei, G. Macchi, music R. Vlad, with M. Mastroianni, A. Fabrizi, A. Ninchi, Lucia Bosè, Y. Montand, Fortezza Film Prod. Rome (1951).

14. S. Francia di Celle, E. Ghezzi, eds, *Mister(o) Emmer, l'attenta distrazione*, Torino Film Festival, Turin (2004).

15. M. Emmer, *Il cinema e la matematica: ricordi,* in di Celle et al. [14] pp. 38–39.

16. L. Venturi, *Una visione parallela dell'arte. Memorie inedite di Lauro Venturi (1986)*, in di Celle et al. [14], pp. 119–131.

17. Venturi [16].

18. L. Emmer, director, *Leonardo da Vinci,* music R. Vlad, Documento Film prod., Rome (1952).

19. L. Emmer, director, *Picasso,* music R. Vlad, Rizzoli Prod., Rome (1953). The film was made in Picasso's atelier in Vallauris.

20. R. Vlad, *Sound Track from the Documentary Film "Picasso,"* Folkways records, NYC, FS 3860 (1957).

21. L. Emmer, director, *Bella di notte*, music G. Mahler, RAI 2 prod., Rome (1997).

22. L. Emmer, director, with E. Ghezzi, *Con aura . . . Senz'aura. Viaggio ai confini dell'arte*, music S. Cipriani, Film 7 Prod., Rome (2003).

Manuscript received 1 August 2006.

Michele Emmer is full professor of mathematics at the University of Rome "La Sapienza," Dipartimento di Matematica. His areas of activity are PDE and minimal surfaces, computer graphics, mathematics and arts, mathematics and culture, and film and video. Almost all his movies in the series Art and Math *have been broadcast by State Italian television as well as other television; the videos are distributed internationally in various versions. His most recent books are* Visibili armonie arte cinema teatro matematica *(Bollati Boringhieri, Turin, 2007);* The Visual Mind 2 *(MIT Press, 2006);* Mathematics and Culture VI *(Springer Verlag, 2008); a chapter in* Venise *(Flammarion, Paris, 2006); and* Matematica e cultura 2008 *(Springer, 2008). He also contributed to* Flatland *(DVD, Bollati Boringhieri, 2008).*

CALL FOR PAPERS

Re-Imagining the Moon

Guest Editor: Sundar Sarukkai

Human exploration of the moon has become the subject of renewed interest, with upcoming space missions from all the space-faring nations, as well as private companies. In late 2008 the Indian Space Agency, ISRO, launched the *Chandrayaan 1* mission to the moon.

The moon has profoundly influenced the human imagination over the centuries, in the domains of myths, religion, art and science. A variety of cultures have generated rich narratives about the moon. The moon is more than a mere object—it is also an image, an illusion, a picture. It inspires stories about lunacy as well as love. It has regulated our lives in a fundamental way by catalyzing calendars based on its movement. Stories of navigation are incomplete without the shadow presence of the moon.

The engagement of poetry, art and literature with the moon has had a profound influence on these activities. The moon also has a political significance—new space projects related to the moon by countries such as Japan, China and India are fundamentally tied to the new articulations of what these countries are and want to be.

The *Leonardo* Special Section "Re-Imagining the Moon" will remind us of this historical, cultural and scientific trajectory in which the moon plays an important part even as it suggests new, *contemporary reflections* on the moon. The section aims to publish articles from a variety of disciplines and hopes to receive articles that explore various social and cultural aspects related to the moon as well as those that engage with the relation between the moon and the artistic and scientific imaginations. Reflecting the universality of this influence, we seek articles from countries and cultures throughout the world.

We are also particularly interested in documenting artists' projects connected to current space exploration missions to the moon and collaborations between artists, scientists and engineers on moon projects.

Deadline: This is a three-year project. Manuscripts will be considered on an ongoing basis until 2012.

Submissions: Send manuscript proposals to Leonardo, 211 Sutter St., Suite 501, San Francisco, CA 94108, U.S.A. E-mail: <leonardomanuscripts@gmail.com>.

Authors are encouraged to submit a manuscript proposal before sending a full manuscript.

Author Instructions: <www.leonardo.info/isast/journal/editorial/edguides.html>.

The project is part of the activities of the Leonardo Space Arts Working Group: <www.leonardo.info/spaceart/spaceartproject.html>. The project follows on the Bangalore Space and Culture Symposium held in 2007, a collaboration of the National Institute for Advanced Studies, The Arts Catalyst, Leonardo/OLATS and the Srishti School for Art, Design and Technology: <http://cema.srishti.ac.in/space/?cat=5>.

Sundar Sarukkai, trained in physics and philosophy, has a Ph.D. from Purdue University. His research interests are in the areas of philosophy of science, philosophy of mathematics, postmodernism, phenomenology and philosophy of art, drawing upon both Western and Indian traditions. His books include *Translating the World: Science and Language* (University Press of America, 2002), *Philosophy of Symmetry* (IIAS, 2004) and *Indian Philosophy and Philosophy of Science* (CSC, 2005). Currently he is professor and dean of the School of Humanities and head of the Centre for Philosophy at the National Institute of Advanced Studies, Bangalore, India.