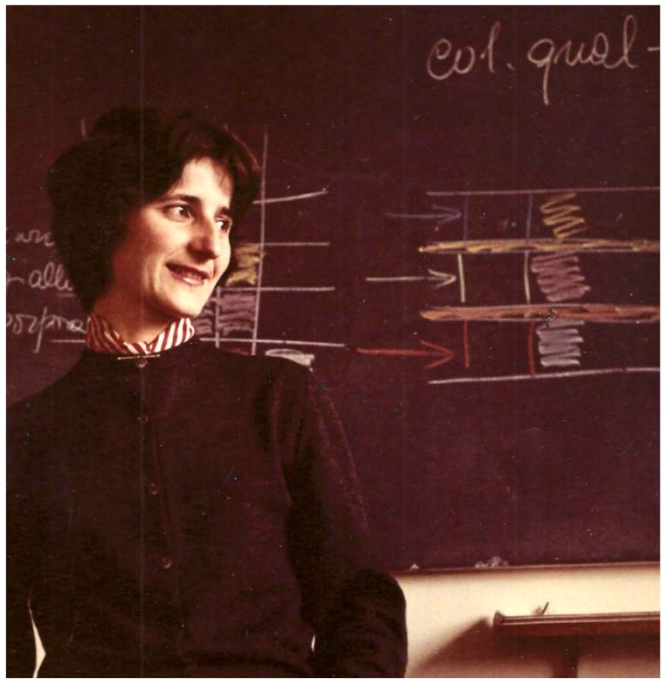
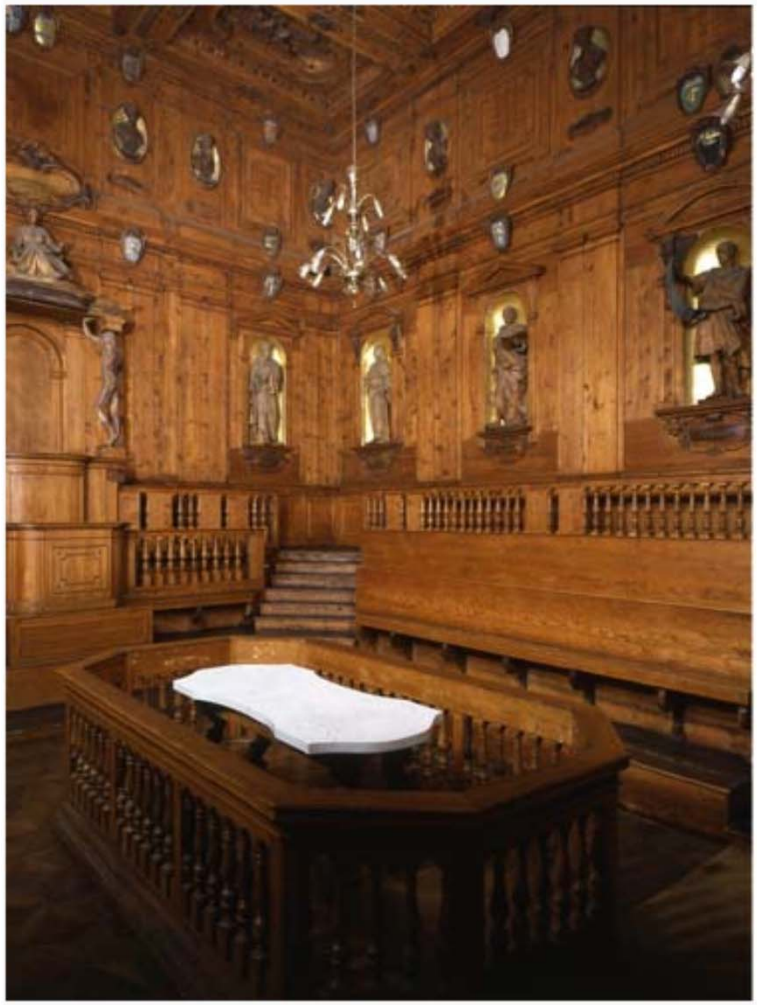


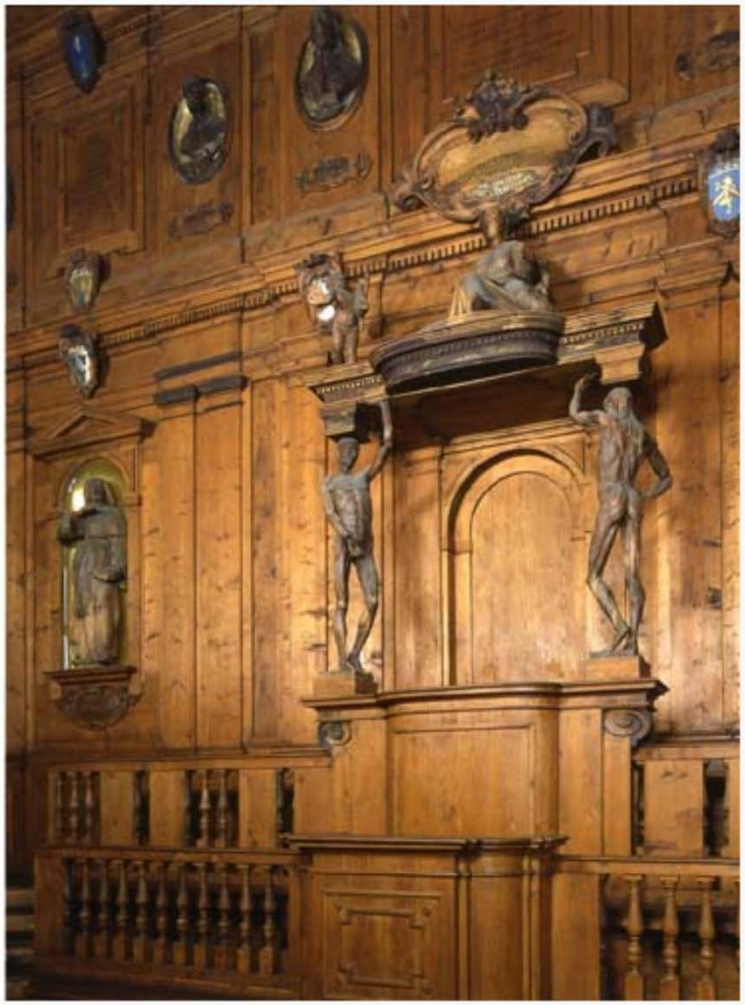
Laura Bassi et Adriana Fiorentini: réalisations et difficultés de deux dames italiennes dans les sciences, au 18ème et au 20ème siècle

Marco Piccolino National Institute of Neurosciences, Université de Ferrara, Italie

marcopiccolino.org **marco.piccolino@yahoo.it**

Laura

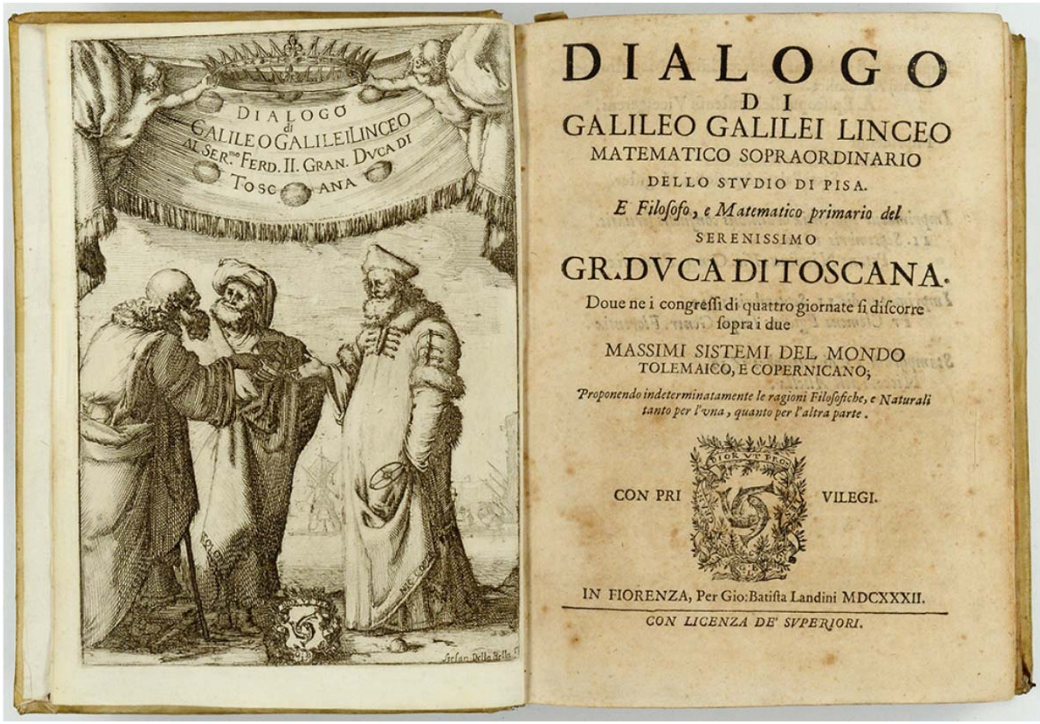


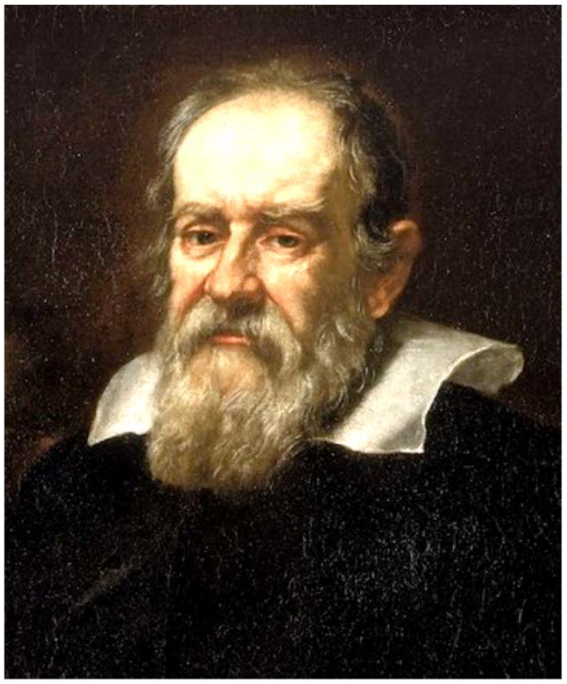


In the background of Laura Bassi's events: The crisis of the Bologna University in the 17° century

The «Galileo affair»

The *Dialogo* was published in 1632, with the Vatican approval, and soon (1633) put in the *Index librorum Prohibitorum*, where it remained until 1834





Galileo Galilei (1564 -1642)

It was the beginning of a complex and difficult historical phase in the relations between catholic church and culture and science, already deteriorated as a consequence of the Counterreformation

In Bologna, in the second half of the XVII century, despite a general stagnation of the University (the ancient and glorious *Studium)*, modern scientific and humanistic cultures were kept alive by a series of more or less private academies or private schools, promoted by scholars of the university (the so-called *novatores*), enlightened aristocrats and also liberal prelates
Among the last ones, Anton Felice Marsili, the member of a noble family of the city, who was appointed as Archdeacon of the Cathedral, a function which included among its prerogatives also the role of Chancellor of the University.
Marsili, who ruled two academies (one of religious studies and another of experimental philosophy - i.e. science), tried unsuccessfully to reform the University and introduce modern attitudes in both cultures.

DELLE
PREROGATIVE
DEL
Cancellierato Maggiore
DELLO STUDIO GENERALE
DI BOLOGNA
Carico depositato nell'Arcidiacono
della Metropolitana di essa Città
RACCOLTE
DA MONSIGNORE
ANTONIO FELICE
MARSIGLI
Moderno Arcidiacono, e Maggior
Cancelliere.

IN BOLOGNA, M. DC. XCII.

Per gli Eredi d'Antonio Pisarri, Con licenza
de' Superiori.

Geminiano Montanari
1633-1687

Marcello Malpighi
1628-1694

Gian Domenico Cassini
1628- 1712

Carlo Fracassati
1630-1672

Domenico Guglielmini,
1655-1710

Anton Maria Valsalva
1666 – 1723

Eustachio Manfredi
1674-1739

Giovan Battista Morgagni,
1682-1771

Among those academies the most important were:

***Coro Anatomico* or *Accademia Massariana* directed by Bartolomeo Massari (University Professor)**

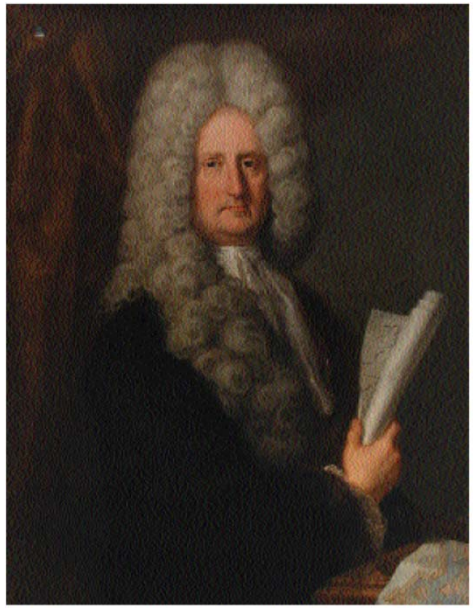
***Accademia della Traccia* (or *Accademia dei Filosofi*) established by Geminiano Montanari (University Professor)**

***The two academies of the Archdeacon* (the *Accademia ecclesiastica* and the *Accademia filosofico-esperimentale*)**

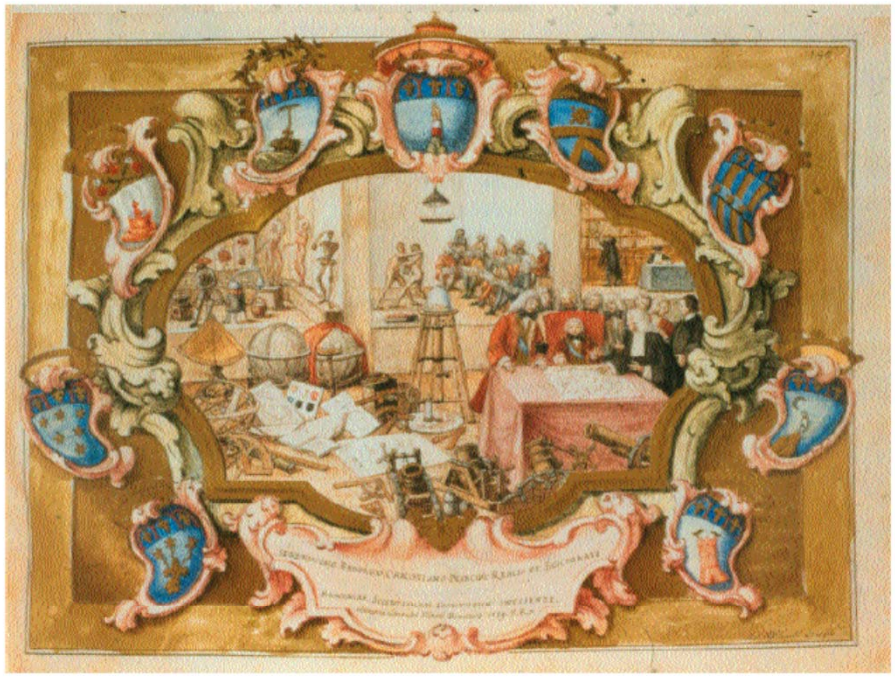
And especially the *Accademia degli Inquieti*, established in 1691 by the young (16th years old) Eustachio Manfredi in his home, initially as a pure philosophical academy, but eventually turned into one of the main sites of scientific innovation of the city. Besides the interest in anatomical studies (in the tradition of Malpighi and Valsalva), the *Inquieti* pursued other dimensions of modern sciences, and particularly astronomy. One of them, Gabriele Manfredi (Eustachio's brother) was the first to introduce infinitesimal calculus in Bologna. The *Inquieti* became soon interested in the new science of Isaac Newton.

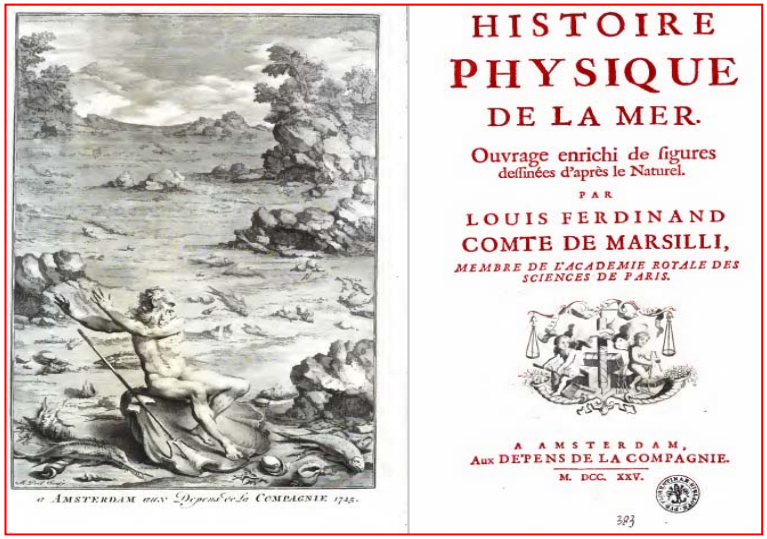
At the beginning of the next century, the *Inquieti* turned to be the nucleus of the institution bound to become the centre of scientific renewal in Bologna in the XVIII century, and a fundamental reference for the history of Laura Bassi and other Bolognese women in science.

The starting point was their involvement in the plans of reformation of the culture and society of Bologna envisioned by a singular figure of scientist, soldier, diplomatic of vast interests, of extraordinary energy and great pragmatism, Count Luigi Ferdinando Marsili, the brother of Anton Felice, the Archdeacon. In some way Luigi Ferdinando would succeed in the enterprise in which his brother had failed.



Luigi Ferdinando Marsili 1658 – 1730





HISTOIRE
PHYSIQUE
DE LA MER.

Ouvrage enrichi de figures
dessinées d'après le Naturel.

PAR

LOUIS FERDINAND
COMTE DE MARSILLI,

MEMBRE DE L'ACADEMIE ROYALE DES SCIENCES DE PARIS.

A AMSTERDAM,
Aux DEPENS DE LA COMPAGNIE.
M. DCC. XXV.

383

ŒUVRES COMPLÈTES DE FONTENELLE.

ÉLOGE
DU COMTE MARSIGLI.

Dans ce palais habitent six professeurs, chacun dans le quartier de la science qui lui appartient. On croit voir l'Atlantide du chancelier Bacon exécutée, le songe d'un savant réalisé. Il sera facile de juger qu'on n'a pas oublié un observatoire. Il est occupé par Eustachio Manfredi, astronome de l'institut, si ce n'est pas lui faire tort que de le désigner par cette seule qualité, lui qui allie aux mathématiques les talens qui leur sont le plus opposés.

Marsili… philosophe, non pas dans le Cabinet, mais en Mer, éloigné du commerce des gens de Lettres, seul parmi des Matelot, non pas dans le silence et la tranquilité [*sic*], mais parmi le tumulte et les clameurs… ***Hermann Boerhave, 1725***

The *Istituto delle Science*, established by L. F. Marsili in 1714, included two academies (one of Arts, the *Accademia Clementina* created by Marsili himself, and the other of Sciences, *Accademia delle Scienze*, based on the *Inquieti*), a Library and a Museum (both largely based on donations by Marsili of the materials accumulated during his adventurous life around Europe and Middle-East, as a military, diplomatic and scientist.

However, it was new with respects to former academies, mainly because it was based in a series of laboratories (*camerae*). These were six in number in the original constitution established in 1711, but will increase in number in the following years and will include the ones for astronomy (with an observatory), optics, chemistry, physics, anatomy, natural history, obstetrics, geography, nautical and military sciences, antiquities.


DE BONONIENSI
SCIENTIARUM
ET
ARTIUM
INSTITUTO ATQUE ACADEMIA
COMMENTARII.

BONONIAE MDCCXXXI

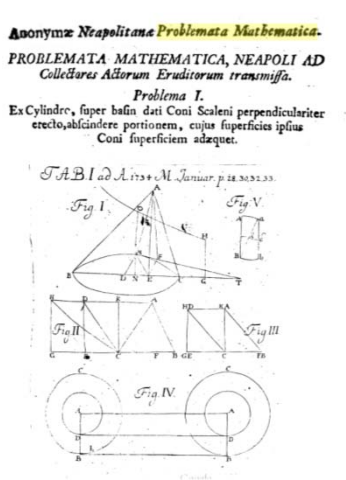

Francesco Maria Zanotti
1692 - 1777

The members of the Institute should carry out research in their respective fields, present publicly their results, and give lectures, based on demonstrations and experiments, and not on purely verbal dissertations. In the original "constitutions" conceived by Marsili in 1711, the *Istituto* should also favour the development of "mechanical arts", and should include a series of specialised technicians with an active, and somewhat intellectual, role (according to the attitude promoted mainly by Bacon and Galileo in the XVII century).

The first years of the *Istituto delle Science*, were, however, difficult, due to a series of problems, and particularly to the problems created by the most conservative part of the Bolognese society, and by many of the University professors, opposed to modern science and trying to preserve their ancient privileges. Marsili died in 1730, but meanwhile the *Istituto had* entered under the protection of Cardinal Prospero Lambertini, a Bolognese aristocrat, who was appointed in 1731 as archbishop of his native town. Lambertini's patronage became even more powerful when he was elected pope in 1740 (assuming the name of Benedict XIV). Starting from 1736, Lambertini initiated a profound reorganization of the *Istituto;* in 1745 he created a new class of members (called after him *Benedettini*) who received a salary for their research activity. He also donated to the *Istituto* a rich collection of scientific instruments which were of fundamental importance for the new and more active phase of the experimental research and teaching in this institution.

Prospero Lambertini,
Pope Benedict XIV,
1675-1758

Laura Bassi,
1711-1778



Faustina Pignatelli,
1705-1785

Maria Gaetana Agnesi,
1718-1799

Maria Dalle Donne,
1778 –1842

Émilie du Châtelet, 1706-1749

Anne Marie du Bocage, 1710-1802

Marguerite Lecomte, 1717–1800

It was in the *Istituto* that initiated, on 20th March 1732, the formidable career of Laura Maria Caterina Bassi, who was then a little more than 20 years old, being born in Bologna on 29th October 1711.

On that day Laura was ascribed to the *Accademia delle Scienze dell'Istituto*, the first woman reaching this dignity.

Among the scholars who supported her in this occasion were Eustachio Manfredi and Jacopo Bartolomeo Beccari, then president of the Istituto. Beccari, and the academy secretary, Francesco Maria Zanotti, were charged to express to Laura the "high esteem that the academy had of her intelligence".

Laura's career will lead her to become the first professor in a Western university, and the first *dottoressa* (*doctrix*) of Bologna university, thus making her an emblem of the success of women in entering the apparently inexpugnable "men-only world" of scientific endeavour and university teaching.

However, in promoting her, the Bolognese ruling classes did not intend to concede to women in general the possibility to access culture and science in a similar way to men.

By a large extent, they wished instead to promote the image of the university and of the city, by taking profit of the prodigious intellectual qualities of this learned young woman.

It was only due to Laura's intelligence, willingness, endurance, hard work and fine diplomacy that these plans resulted in the success of the young *dottoressa* and in the unexpected and (by many) undesired outcome of opening the path to the access of women to the "no-women" world of science.




Laura's ascension was marked by the character of exceptionality. On 17th April 1732 the public discussion of the 49 theses of logic and natural philosophy, necessary for the university degree (*Laurea*), was held in the *Palazzo pubblico*, with all the main authorities of the city.

On 12th May 1732 she graduated in a similar ceremony also held in the Palazzo Pubblico.
Few days afterwards she was made member of the *Collegio dei Dottori di Filosofia.*

On 27th June 1732 she discussed a number of other thesis of a more physical and modern scientific character, marking her distance from her main teacher Gaetano Tacconi (who was more inclined to traditional philosophy and science).

On 29th October 1732, on the day of her 21° birthday, she gave her first lecture as a teacher *Omniae philosophiae* in the main hall of the *Archiginnasio*, the historical building of the ancient university.

On 1745, the year of the creation of the *Benedettini* class of the Istituto, Laura was appointed as extraordinary and supernumerary member of this élite group, following a *motu proprio* of the Pope.

The ceremonies of Laura's career, and other public or private exhibitions of her learning, were attended by important authorities, by various dignitaries and also by foreigners (as for instance the French prelate Cardinal Melchior de Polignac , who was present to her graduation). Numberless poems were written to celebrate Laura's culture and achievements; portraits; engravings, medals and other kinds of artistic tools were created to honour her as a "new Minerva" (the Greek virgin goddess of learning being the symbol of the town).

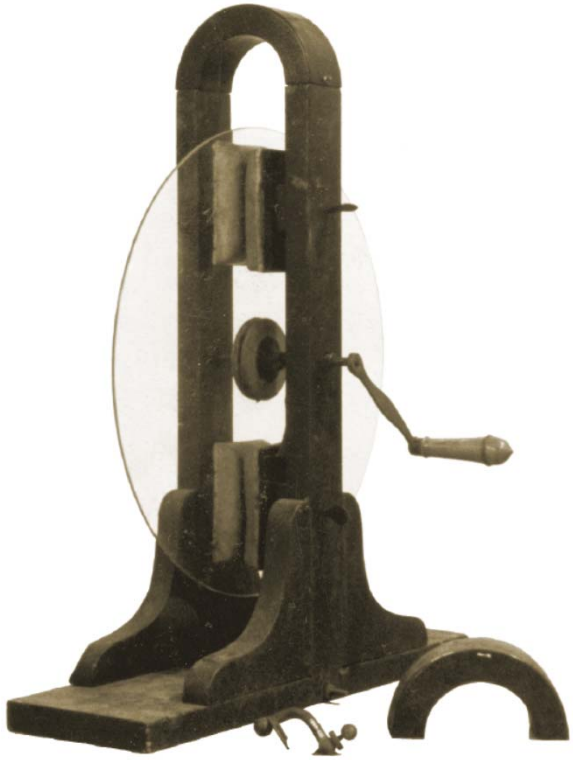
Despite being given a salary, both as university professor and as *Benedettina* member of Istituto, Laura realised soon that all these were void honours. She could not give ordinary lectures at the university as her male colleagues, this being explicitly "because of the sex" (*ratione sexu*); for the same reason she could not participate in the elections of new members of the Istituto. Many other limitations marked her distance from men having formally the same roles or functions.

In a century still dominated by the baroque style of the sumptuous public exhibitions, Laura could have resigned herself to this life of honours and magnificence. However, she had a genuine attraction for modern science and a strong character, not easy to be manipulated and take directions imposed from outside.

Soon she had to face the gossips circulating on her, as a young and attractive girl exposing his womanly purity and virtues to mundane temptations, because of her male frequentations imposed by her scholarly activities. She refused, however, the almost obliged choice of a woman of her epoch wishing to pursue an intellectual endeavour, i.e. entering a monastery and taking the vows. This choice, compatible in principle with an intellectual activity of ecclesiastic and humanistic type, would have precluded a genuine scientific activity.

As she overtly wrote to one of her correspondents, having long considered this first possibility, eventually she decided, in a rational way, to become a married woman, and chose as her husband a colleague, Giuseppe Veratti. The condition was that Giuseppe would not interfere with her plans as a scientist and a teacher. Laura and Giuseppe married in 1738, and far from impeding the scientific projects of her wife, the husband, who was also a scholar, although involved mainly in medical researches, supported his wife and collaborated with her; the Laura-and-Giuseppe couple isa rare case of “two-voices science” with a woman dominance.

Until the very last phase of her life, Laura was in the impossibility of pursuing experimental research and official teaching in public establishments. Therefore, with the help of her husband, she decided to create, in 1748, a private school of experimental science and a home laboratory.
These two domestic institutions became the main places of development and propagation of modern science in Bologna, being attended by numerous university students and by young researchers, some of whom would become very great scientists (such as Lazzaro Spallanzani and Luigi Galvani) .



Electric machine belonged to Luigi Galvani

OSSERVAZIONI
FISICO - MEDICHE
INTORNO ALLA
ELETTRICITA'
DEDICATE
ALL' ILLUSTRISSIMO, ED ECCELSO
SENATO
DI BOLOGNA
DA GIO: GIUSEPPE VERATTI
Pubblico Professore nella Università,
E nell' Accademia delle Scienze dell' Istituto Accademico Benedettino.

IN BOLOGNA
Nella Stamperia di Lelio dalla Volpe. 1748.
Con licenza de' Superiori.

Title page of Veratti's book on medical electricity containing the results of experiments carried out in Laura's and Giuseppe's home laboratory

As he wrote in 1766, Galvani used to communicate the results of his own experiments ***"to the very learned Veratti [...] and to his exceptionally scholarly wife, Laura Bassi, who is without doubt a singular ornament of our city"***

Lucia Galeazzi Galvani, 1743-1790

Luigi Galvani, 1737-1798

We could appreciate the diligent capacity of acting and the endurance, which are maximally typical of women, as also the intelligence, if for most of the time they were not obliged to consume themselves in the greatest ignorance, as in the worst prison**. Luigi Galvani, 1775**

The only two published scientific memoirs of Laura Bassi. Both appeared in the *Commentarii* of the Bologna *Istituto*

LAURAE BASSIAE.

De problemate quodam hydrometrico.

QUamvis plerique Auctores, qui de aquarum in vasis cujuscumque figuræ contentarum erogatione præclara multa ediderunt, rem eo tandem perduxerint, ut alii quidem vasorum cujusvis figuræ, positionis, atque amplitudinis evacuationum tempora, ope supputationis integralis, accurate definiverint, alii vero aquarum constantem altitudinem servantium per datæ magnitudinis lumina erogationes accuratissimis experimentis ad mensuram, & pondus revocaverint, inter quos clarissimi Cives nostri Dominicus Gulielminus, & Victorius Stancarius, & postremis his temporibus Eustachius Manfredius, inter exteros vero Hermannus, Bernullii, Zendrinus, aliique permulti; videntur tamen non omnem quidem aliis occasionem præripuisse nonnulla etiam in praxi, non omnino inutilia, excogitandi, atque proponendi. Inter cætera cum nondum satis compertum mihi visum sit, qua ratione fluidorum per foramina prodeuntium leges ad usum accommodatæ sint, ut facile inter se comparari possint aquarum e canalibus per lumina diversæ magnitudinis, aut profunditatis, eductarum quantitates ab iis potissimum, qui cum praxi se dederint, de geometricis theorematibus minus, ut plurimum, sollicitos se præbere solent, hinc disquisitionem non indignam, quæ Academiæ proponatur, me susceptúram judicavi, si problema solvendum assumerem, ex quo determinari posset, cujus amplitudinis, aut quo in loco infra aquæ superficiem foramina aperire oporteat, ut eadem aquæ vis dato tempore per illa obtineatur, quæ per unum, aut plura diversæ magnitudinis, aut diversimode constituta, obtineri eodem tempore consueverat, vel quæ ad illam in quacumque alia ratione se habeat. Quam quidem indaginem ideo a celeberrimis illis Auctoribus, qui hydrometriæ scientiam, sublimioris etiam calculi ope, mirum in modum auxerunt, atque exornarunt, omissam fuisse puto, quod gravioribus difficultatibus quæstiones illas obvolvi non posse judicarent, ad quarum solutionem, ut in hac nostra, simplex communis analysis sufficeret.

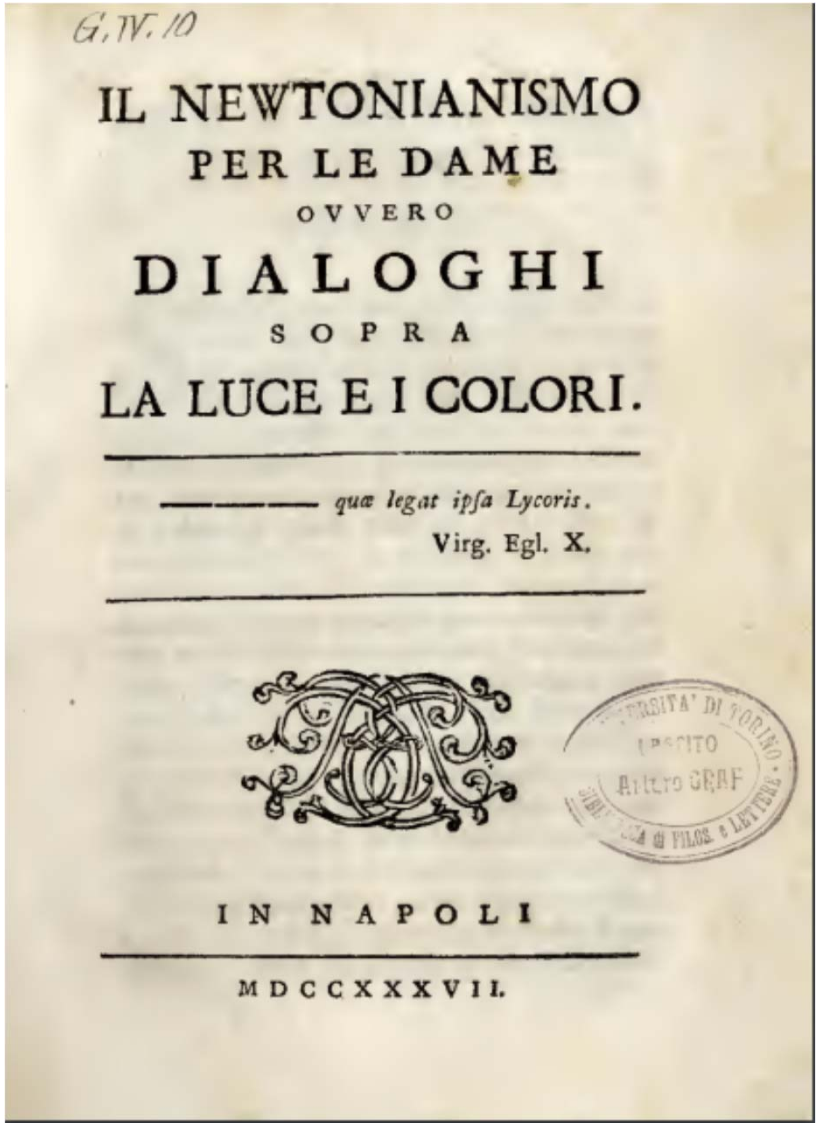
LAURAE BASSIAE.

De problemate quodam mechanico.

CUm in eorum, quæ de gravitatis centro a geometris tradi solent, inquisitione occupata rem omnibus modis versare studerem, contigit, ut animum præcipue in summam illam, ac plane infinitam curvarum varietatem intenderem, quæ a semita communis centri gravitatis duorum, vel plurium corporum æquabili motu per curvas quascumque uniformiter progredientium designantur, exploratura num datis directionibus corporum se moventium, quæ quidem pro singulis tempusculis mutabuntur, ubi corpora per lineas curvas ferri ponamus, directio communis eorum centri gravitatis posset determinari; quæ quidem directio in singulis punctis optime determinatur per tangentem ducendam ad singula ejus curvæ puncta, quam centrum ipsum gravitatis suo motu designat. Ad hoc autem obtinendum id unum requiri intelligebam, nempe ut designaretur punctum illud, in quo eadem tangens rectam quamdam aliam secaret, quæ vel esset positione data, vel data saltem lege duci posset. Etsi vero non me latebat infinita casuum, quos quæstio admittit, varietas, ac complicatio pro variarum linearum a corporibus motu suo descriptarum natura, ac positu, proque diversa, quam sortiri possunt motus isti, inter se habitudine, eam tamen mihi spem in analytica methodo reponebam, (cui nulla sane in universa geometria quæstio non patet) ut non modo difficillimam hanc indaginem aggredi non dubitaverim, sed & problemati majorem quoque amplitudinem conciliare statuerim, quo illam, quam initio assumpseram, quæstionem, tamquam generalioris cujusdem theorematis peculiarem casum, tractarem. Id ubi faciam, etsi rem plane geometricam prosecuta videbor, præsertim si generalis proponendi problematis solutio attendatur, cum tamen, generalem ipsam quæstionem ad peculiarem casum contrahendo, de centri gravitatis via, ac directione differam, rem quoque cum physicis disquisitionibus maxime conjunctam me pertractasse constabit.

Pro-

Being strongly mathematized, Laura's approach to scientific endeavour was clearly infringing the limits of the "science for ladies", defined by Francesco Algarotti in a famous book



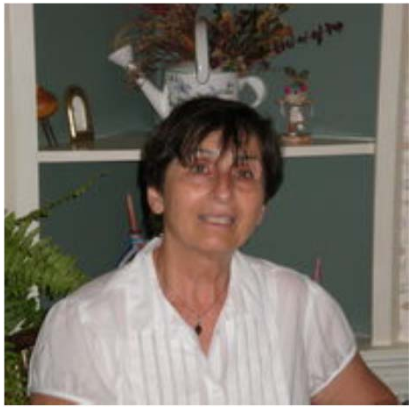
G. IV. 10

IL NEWTONIANISMO
PER LE DAME
OVVERO
DIALOGHI
SOPRA
LA LUCE E I COLORI.

——— *quæ legat ipsa Lycoris.*
Virg. Egl. X.

IN NAPOLI

MDCCXXXVII.



The *ancien régime* was neither able to accept the idea of all women's right to education and to participation in public life, nor to admit a conjugal agreement based on equality. In such a cultural context, the Bologna's episodes of celebration and recognition of the learning of a number of women were possible only because they were functional to the strategies of power and propaganda of male political and religious authorities, who counted on the exceptionality of such women and of the public posts appointed to them in the academy or in the university in order to gain fame for themselves or their town.

Marta Cavazza, 2008

Adriana

Adriana Fiorentini

The Italian Lady of Visual Sciences

Milano 1926 - Marina di Pisa 2016

Her scientific work, always of high profile, has been initially in physical and instrumental optics, and, afterwards, in the psychophysiology and neurophysiology of vision.

Adriana in 1992, during the European Conference on Visual Perception organized in her honour in Pisa

Adriana's scientific career:

1946: Degree in Physics at the University of Florence

1948-1968: Researcher at the National Institute of Optic of Florence

In 1956: «Libera Docenza» (*Privatedozent*) in Physiological Optics

1968-1970: Research Assistant at the University of Pisa

1968 - until the retirement in 1992: Researcher at the Institute of Neurophysiology of the National Research Centre (C.N.R.)

Adriana has been a member of various National and International scientific societies, and member of the editorial board of various international journal as:

Vision Research
Behavioural Brain Research
Human Neurobiology
Psychological Research
Perception
Clinical Visual Sciences
Archives Italienne de Biologie

Adriana in 1954, in Florence, with the staff and students of the National Institute of Optics. At the centre of the picture Vasco Ronchi, the founder and director of the Institute.

Adriana in 1969, at the C.N.R. Laboratory of Neurophysiology of Pisa, with some of the staff members, including the director, Giuseppe Moruzzi, and the scientific council member, Ragnar Granit, Nobel Prizer winner in 1967.

Un metodo molto preciso per la misura della distorsione degli obbiettivi fotografici.

Dott. ADRIANA FIORENTINI - Prof. G. TORALDO DI FRANCIA

Estratto dagli "ATTI DELLA FONDAZIONE G. RONCHI"
Anno VII - N. 3 - Maggio-Giugno 1952

Estratto dagli "ATTI DELLA FONDAZIONE G. RONCHI"
Anno X - N. 1 - Gennaio-Febbraio 1955 - Pagg. 54-60

L'influenza dei gradienti di illuminamento retinici e delle loro variazioni sulla sensazione soggettiva di brillanza

Dott. ADRIANA FIORENTINI

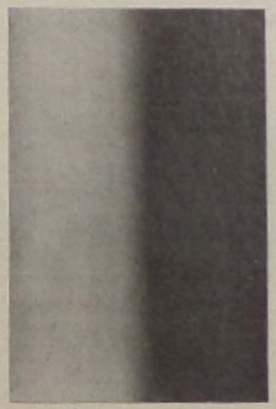
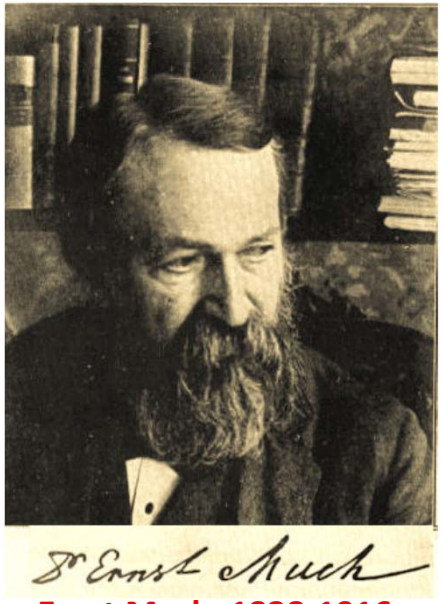


Fig. 1
Penombra di un ostacolo a bordo rettilineo illuminato con una sorgente rettangolare.

Giuliano Toraldo di Francia
1916 –2011



Ernst Mach, 1838-1916

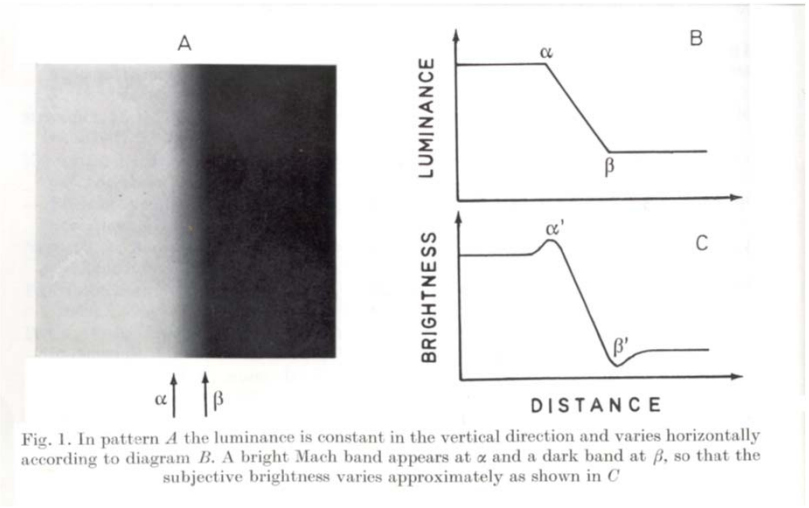
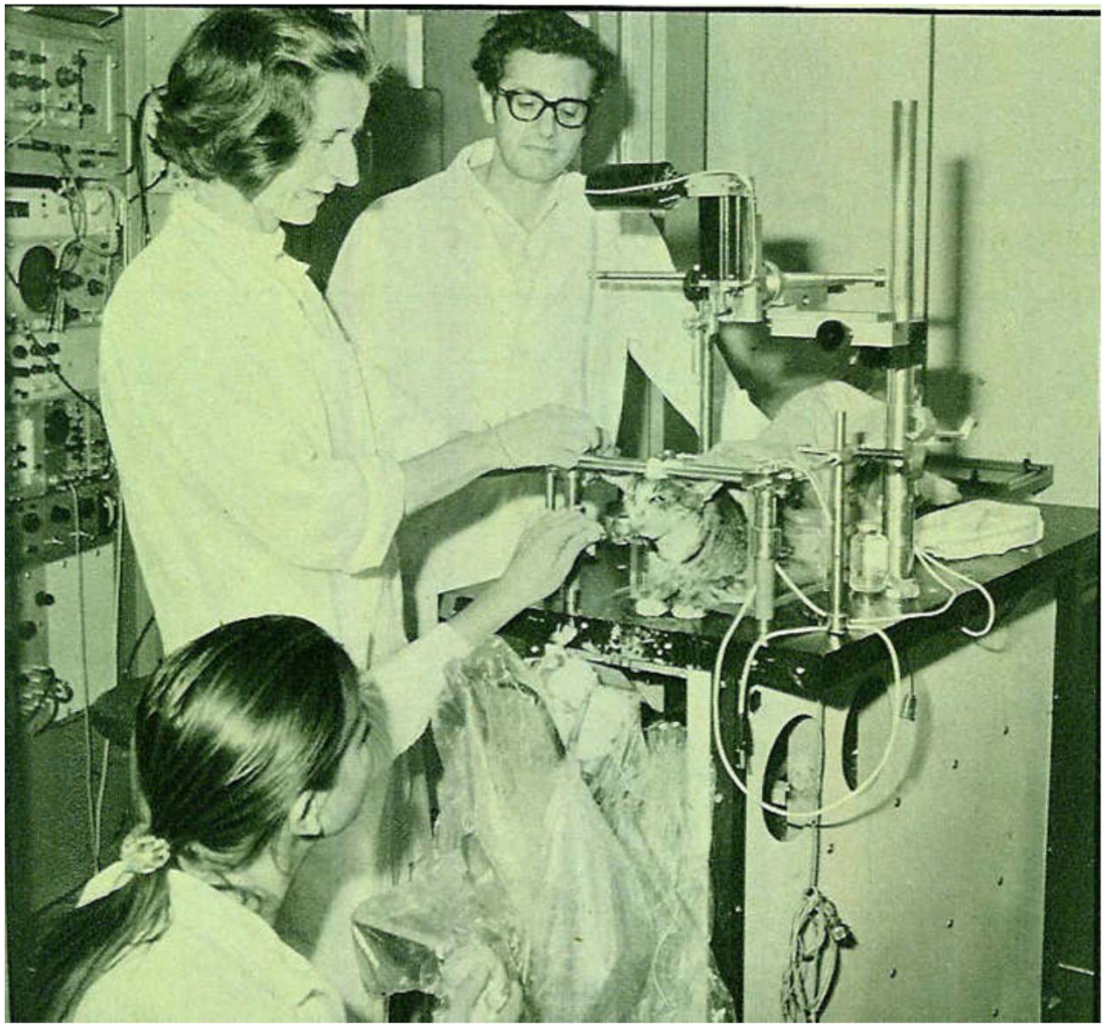


Fig. 1. In pattern *A* the luminance is constant in the vertical direction and varies horizontally according to diagram *B*. A bright Mach band appears at α and a dark band at β, so that the subjective brightness varies approximately as shown in *C*

The Mach Bands, were for Adriana "*an ancient and persistent laboratory love*" (in the sense expressed by Ramón Y Cajal)

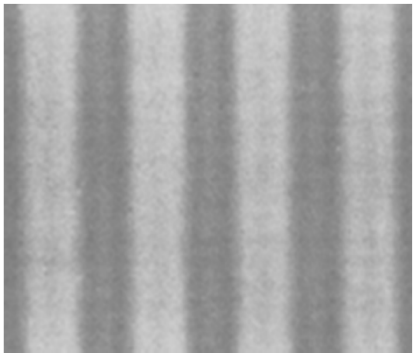
Vasco Ronchi and the National Institute of Optics in Florence, on the hill of Arcetri (the place where Galileo passed the last years of his life, in a condition of home reclusion). He was a prominent scientist, an important science historian, but also a dominant personage.



In 1968, Adriana starts working in the C.N.R. Neurophysiological Laboratory in Pisa, then directed by Giuseppe Moruzzi. This was the beginning of a life long and very successful collaboration with Lamberto Maffei, a talented neurophysiologist, but also a dominant personage himself.

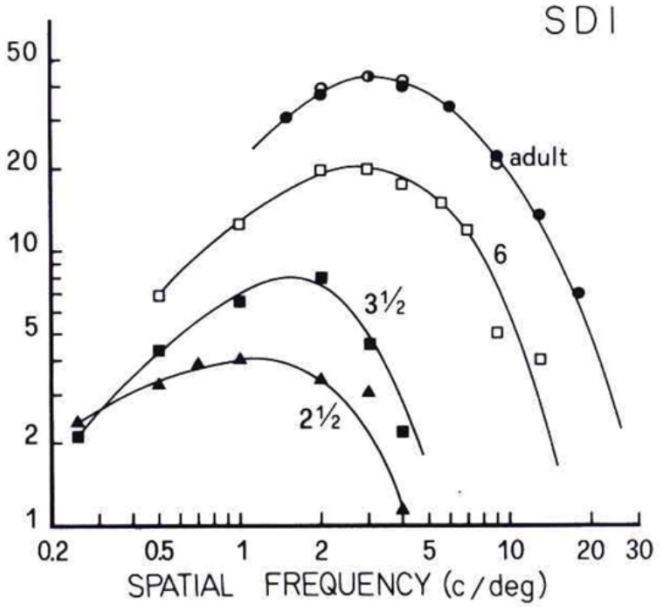
In part continuing her work on vision with psychophysiological techniques, together with Lamberto, Adriana could study vision at level of neurophysiological processes with electrophysiological methods in both animals and humans.

One of their main study topics was the quantitative investigation of the spatial and temporal characteristics of visual function based on the use of the Fourier's analysis; this was a research theme that Adriana had already started studying in Florence with a purely psychophysiological approach.

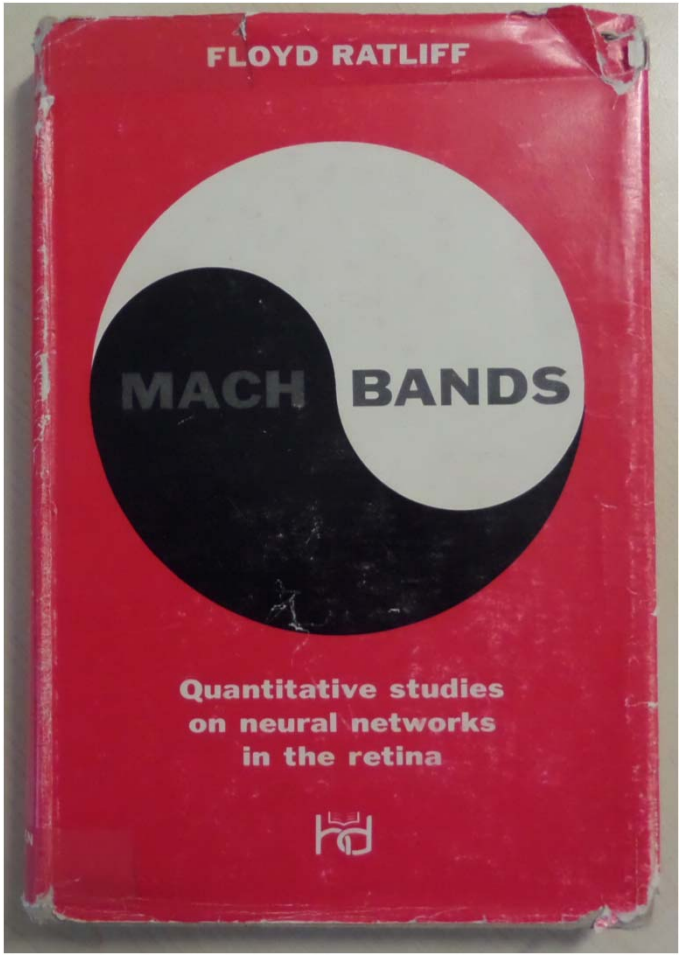


Compound gratings generated by a Digital PDP 11/03 computer were displayed on a Tektronix oscilloscope, 34 cd/m² mean luminance. The luminance profile of the grating was the sum of two sinusoids of spatial frequency f and 3f with contrast ratio 3:1, like the fundamental and third harmonic of a square wave. The relative spatial phase of the 3f component could be pre-set at any value between 0 deg (peak-subtract) and 180 deg (peak-add) under computer control. A piece of

In particular, Adriana and her collaborators were able to characterise, by the Visual Evoked Potentials technique (VEP), the spatial vision in infant children, starting from the new-born phase until the full maturation. These studies have been of paramount significance, also from the clinical point of view, because they allows the ophthalmologist to detect early impairments of visual function, and intervene accordingly in a timely phase of the development (thus preventing visual maturation disorders).



Contrast sensitivity functions evaluated from VEP in response to sinus gratings in an infant at 3 different ages (2.5, 3.5 and 6 monts) and in an adult subject.



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With 1 plate and 5 text-figures
Printed in Great Britain

THE CONTRAST SENSITIVITY OF THE CAT

BY F. W. CAMPBELL, L. MAFFEI AND M. PICCOLINO

From the Physiological Laboratory, Cambridge and Laboratorio di Neurofisiologia del CNR, Pisa, Italy

(*Received 7 September 1972*)

At this point, one could wonder why I have put together these two women scientists, so distant from a temporal and social point of view: one from the XVIII century, an epoch in which women were not allowed to pursue research and hardly had any active role in the society (even though, paradoxically, a few of them could be ruling Queens).

This is for a variety of reasons, ad mainly because of the similarities and differences between them.

SIMILARITIES:

Both Laura and Adriana were of very high intellectual and moral standards.
Both were sincerely interested in science, at the intersection of physics and life sciences, pursuing their investigation with rigorous mathematical approaches (and certainly not within the limits of Algarotti's "women science").
Both were interested in colour vision.
Both were exceptional teachers, according to their students.
Both had many difficulties in realizing their life projects as women scientists, despite the differences of their epochs and societies.
Both were very generous.
Both were two «Grandi Signore» (Great Ladies) in a varieties of dimensions (culture, elegance, humanity, openness, sociability).

DIFFERENCES

Laura was married and had 9 children and took care of them. Adriana never married.

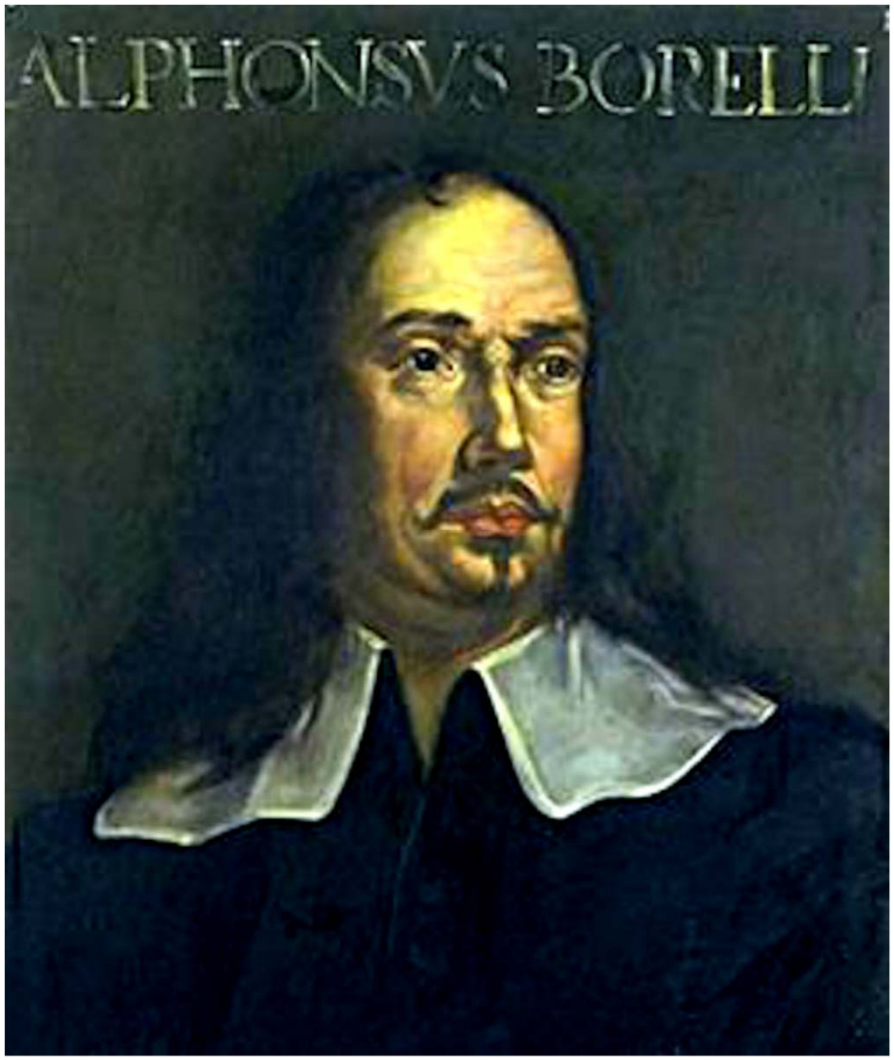
Many of the life energies of Laura were spent in claiming an effective role for women in science and society, and in turning in favour of them the plans of a male-dominated society. Laura did not simply ask, she *prentended* to have rights similar to those of her male colleagues, thus opening the paths to the recognition of the parity between the two sexes in the academia.
Nothing of that in Adriana's case. Having suffered in Florence the arrogance of the male power, and having found in Pisa an ambiance favourable to her scientific research, she renounced to all forms of public career, and to any mundane overt and ambitious expression of her intellectual and social success. She did not apply for professorship in Italian universities (hardly a C.V. of her can found among her papers still in the Pisa lab); nor did she try to become a member of the main Italian academy (the *Accademia dei Lincei*), both achievements being in her reach.
By a large extent Adriana made science «in the shadow». Nevertheless, she did not only have a great scientific success at international level, with her experimental and cultural activity, but also had a deep influence on many of her colleagues, collaborators and students.
Among those last ones, I am happy to include myself.

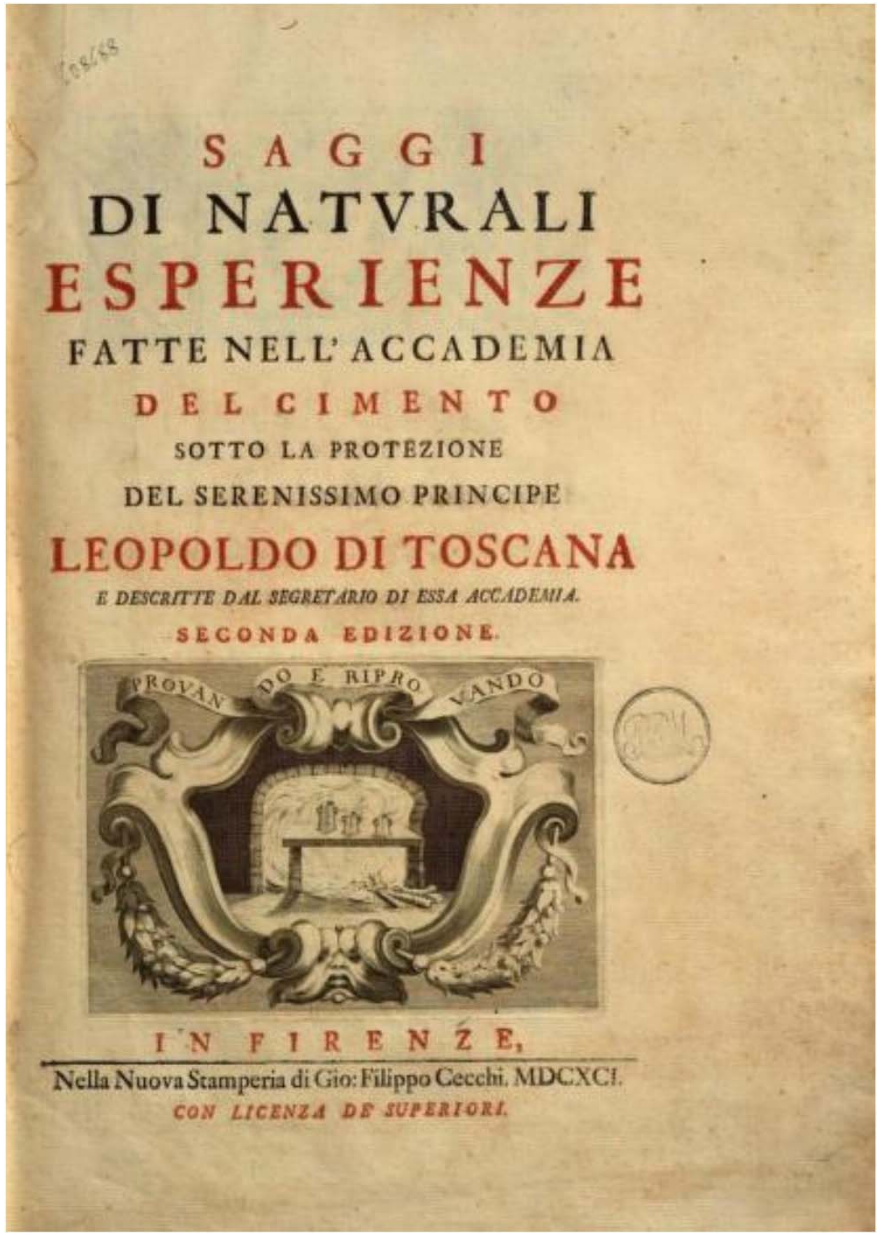
Paying, with this presentation, my tribute to Adriana, and putting her together with Laura Bassi («*gloire de son siècle et de son sexe*» as Voltaire put it), I wish first to remark that women continue to have difficulties in pursuing their social and cultural ambitions, despite the epoch differences.

I want, moreover, also recognize (as a scientist turned to become an "accidental historian") that women (and people in general) are entitled to have different life strategies, provided they pursue them with passion, energy, endurance and great ideal standards.

Merci, Laura

Merci, Adriana





Giovanni Alfonso Borelli, 1608-1676
and the *Accademia del Cimento* (1646)

A. FIORENTINI

L. MAZZANTINI

FATTORI OTTICI E NEUROFISIOLOGICI CHE DETERMINANO LA PERCEZIONE VISIVA

PARTE I. - VALUTAZIONE DELLA DISTRIBUZIONE DELL'ILLUMINAMENTO NELL'IMMAGINE RETINICA

PARTE II. - ALCUNI ASPETTI DEI PROCESSI NEUROFISIOLOGICI CHE INTERVENGONO NELLA ELABORAZIONE DELLE RISPOSTE A UNO STIMOLO RETINICO

Estratto da:

Bollettino d'Oculistica

Vol. XLIV - Fasc. X-XI - 1965

Cappelli editore - Bologna

dove $J_1(2\pi kr)$ è una particolare funzione (funzione di Bessel del primo tipo) i cui valori sono tabulati.

Reciprocamente, la LSF e la CTF si possono esprimere in funzione della PSF come segue:

$$A(x) = 2\int_x^\infty C(r)(r^2 - x^2)^{-\frac{1}{2}} r\,dr$$

$$T(k) = 2\pi\int_0^\infty C(r) J_1(2\pi kr)\, r\,dr$$

E infine, le relazioni che legano tra loro la LSF e la CTF sono:

$$A(x) = \int_{-\infty}^{+\infty} T(k)\cos 2\pi k x\,dk$$

$$T(k) = \int_{-\infty}^{+\infty} A(x)\cos 2\pi k x\,dx$$

Gli integrali nei secondi membri di queste sei equazioni sono calcolabili quando le funzioni che compaiono sotto segno di integrazione abbiano espressioni analitiche particolarmente semplici.

JONES ad esempio determina i valori di due qualunque delle tre funzioni considerate quando si ammetta che la terza di esse sia una funzione esponenziale.

Così, supposto che la CTF sia esponenziale, cioè

$$T(k) = e^{-2\pi a|k|}$$

si ricava

$$A(x) = \frac{a}{\pi(a^2 + x^2)}$$

$$C(r) = \frac{a}{2\pi(a^2 + r^2)^{\frac{3}{2}}}$$

Se si ammette che la LSF sia esponenziale, cioè

$$A(x) = \pi b\, e^{-2\pi b|x|}$$

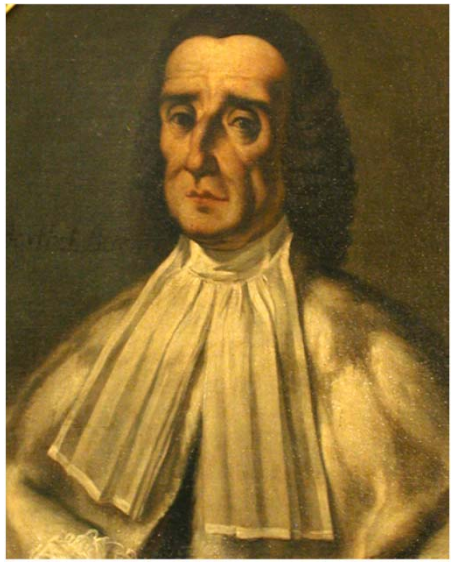
si ricava

$$T(k) = \frac{b^2}{b^2 + k^2}$$

$$C(r) = 2\pi b^2 K_1(2\pi b r)$$

Infine, supposto che la PSF sia esponenziale, cioè

$$C(r) = 2\pi C^2 e^{-2\pi cr}$$



Jacopo Bartolomeo Beccari 1682 -1766

Domenico Gusmano Galeazzi 1686 1775

Francesco Algarotti 1712 - 1764

Felice Fontana 1730 – 1805

Giovanni Bianchi 1693 – 1775

Marc'Antonio Caldani 1725 - 1813