ARCHIWUM HISTORII I FILOZOFII MEDYCYNY 2013, 76 (1), 9–16

ROBERT FERNAND HEITZ

The Evolution of a Concept from 'Glaucoma' to 'Cataract' at the French Royal Academy of Sciences (1705–1708)

Od jaskry do zaćmy — ewolucja poglądów członków Francuskiej Królewskiej Akademii Nauk (1705–1708)

MD, PhD, Strasbourg, France

Summary
From 1705 to 1708 the French Royal Academy of Sciences studied the question of the origin of the blindness by a glaucomatous crystalline lens or by an opaque membrane. The analysis of the proceeding registers of the Academy permit to understand the evolution towards the revision of the century-olds concepts concerning the anatomical position and nature of cataract, the vocabulary and the concept of cataract surgery by couching.

Keywords: history of ophthalmology, cataract, couching, glaucoma, French Royal Academy of Sciences, Michel Brisseau, Philippe de La Hire, Gabriel-Philippe de La Hire, Antoine Maître-Jan, Jean Méry

Streszczenie
W latach 1705–1708 Francuska Królewska Akademia Nauk zajmowała się zagadnieniem pochodzenia utraty widzenia w przypadku jaskrowych zmian soczewki oraz obecności nieprzejrzystej błony. Analiza archiwów tej instytucji pozwala zrozumieć ewolucję poglądów na temat patogenezy zaćmy obejmującą położenie anatomiczne i naturę zaćmy, terminologię oraz zasady operacji zepchnięcia zaćmy do komory ciała szklistego.

Słowa kluczowe: historia okulistyki, zaćma, zepchnięcie soczewki, jaskra, Francuska Królewska Akademia Nauk, Michel Brisseau, Philippe de La Hire, Gabriel-Philippe de La Hire, Antoine Maître-Jan, Jean Méry

Introduction

Up to the end of the 17th century, oculists in their treaties on eye diseases understand the term 'cataract' to mean a membrane held in the pupillary space in front of the lens, "made out nets or sheats formed in the aqueous and which gradually thickened sufficiently to prevent penetration of light rays into the eye". The treatment of this so-called cataract membrane consisted of, "piercing the eye, breaking the membrane and couching it into the bottom of the eye behind the iris. In this way the eye regained its vision".

The term 'glaucoma' was used to describe a disease of the crystalline lens that became opaque with a whitish color. Glaucoma was judged to be incurable, because it was not possible to give back its lost transparency to the crystalline lens.

However, at the beginning of the 18th century, these traditional concepts, which seemed to have been decided once and for all, were brought into question by a so-called 'new hypothesis' summarized in 1706 by *Philippe de La Hire*, before the French Royal Academy of Sciences as follows: "Some physicians are now of the opinion that

there are no layers or membranes that one pushes down when one performs a cataract operation, but it is the crystalline lens itself that has become opaque and that one detaches [this] and then pushes [it] back into the lower part of the eye" [1, 2] (FIG. 1).

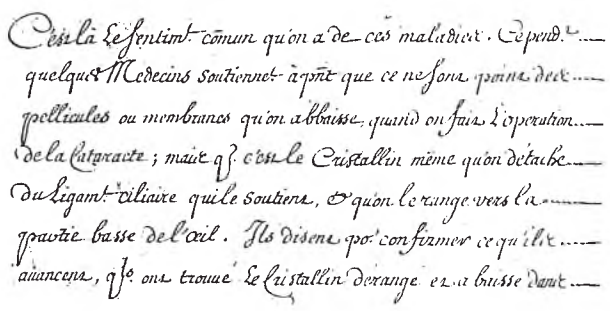


FIG. 1. The physicist and mathematician *Philippe de La Hire (Senior)* critically reviews the *new hypotheses regarding cataract* for the French Academy of Science: *Observations and Reflections on the Nature of Cataracts forming in the Eye* [1]

In deciphering the original register of the proceedings of the (former Royal) Academy of Science in Paris and in comparing the concepts contained in them with other ideas published in scientific books published at the same time, it is possible to reconstitute the evolution of the thought processes that allowed the members of the Academy to question the old theories on cataract and to accept the new hypothesis, after themselves having been the most ardent defenders of the traditional view. We remember, that in 1704, the Academy has already agreed that the ocular fundus of a living eye becomes visible by neutralization of the corneal refractive power by immersion in water [3, 4].

The first questionings (1705–1706)

Michel Brisseau, a surgeon at the French Army located in Tournay, was the first to question traditional concepts. In 1705, he had sent a letter to the Royal Academy of Sciences where Dodard read it on the 18th of November. In this letter he affirmed "cataract is in reality the crystalline lens that has become opaque and when one believes that one has pushed a membrane down from in front of the crystalline lens, actually it is the crystalline lens itself that has been depressed" [5, 6, 7] (FIG. 2).

Brisseau's original letter to the Academy has not been preserved, but it has been published in the Journal de Trévaux and it was reproduced in *Brisseau's Treatise on Cataract and Glaucom* (Traité de la Cataracte et du Glaucoma) published by him in 1709. He describes in this letter the history of a 35-year-old soldier who had suffered from cataract for many years before he finally died at the

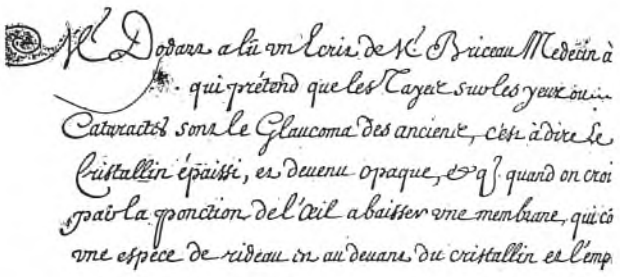
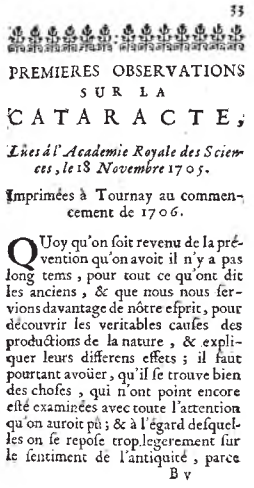


FIG. 2. It fell to *Michel Brisseau,* a surgeon in the town of Tournay, to be the first to question traditional theories on the cataract. In 1705, he had sent a letter to the Royal Academy of Science, where *Denis Dodart* read it on the 18th of November of the same year [6]

hospital in Tournay. The day before his death, *Brisseau* couched the soldier's cataract and removed the eye post-mortem. He found that he had displaced the opacified crystalline lens downwards. The dissection of the other eye showed a normal crystalline lens in its usual position.

The Academy designated two of its members, namely *Dodart* and *Méry*, to examine the validity of *Brisseau's* claims. In the meantime, the rumor had been spread that another surgeon, *Antoine Maitre-Jan* was also challenging the traditional ideas about cataract and was preparing a treatise on that subject. *Dodart* asked *Antoine Maître-Jan's* opinion. *Méry* read his response to the Academy on 17th February 1706. In his letter, *Antoine* confirmed, "cataract is a total deterioration of the crystalline lens that loses its transparency fully or partially". He described various types of cataract and he classified these into 'curable' and 'incurable' but he did not give any case reports [8, 9, 10] (FIG. 3).



33

PREMIERES OBSERVATIONS
SUR LA
CATARACTE,

Lûes à l'Academie Royale des Sciences, le 18 Novembre 1705.

Imprimées à Tournay au commencement de 1706.

QUoy qu'on ſoit revenu de la prévention qu'on avoit il n'y a pas long tems, pour tout ce qu'ont dit les anciens, & que nous nous ſervions davantage de nôtre eſprit, pour découvrir les veritables cauſes des productions de la nature, & expliquer leurs differens effets; il faut pourtant avoüer, qu'il ſe trouve bien des choſes, qui n'ont point encore eſté examinées avec toute l'attention qu'on auroit pû; & à l'égard deſquelles on ſe repoſe trop legerement ſur le ſentiment de l'antiquité, parce

B v

FIG. 3. Brisseau's letter to the Royal Academy was published in his *Treatise on Cataract and Glaucoma* (*Traité de la Cataracte et du Glaucoma*, Laurent d'Houry, Paris 1709, p.33).

Following the reading of this letter, *Philippe de La Hire* defended the traditional concepts. He argued that glaucoma is always an incurable disease, that the crystalline lens is the principal organ of the sight, and that operating surgically on this resulted in irremediable blindness. *La Hire* had carried out unsuccessful couching experiments on the eyes of oxen. He concluded from these cases that, notwithstanding that there were examples where people who had apparently had their cataract couched were able to see without a magnifying loupe, these individuals had not, in reality, had their crystalline lenses couched [11] (FIG. 4).

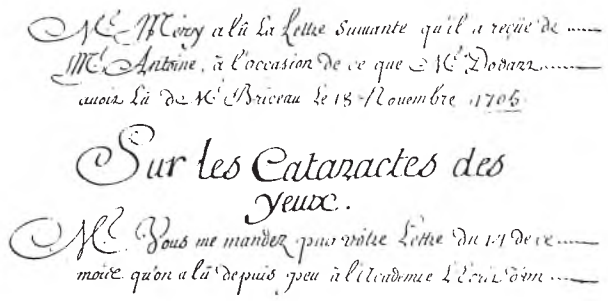


FIG. 4. In the name of the French Academy of Science, *Denis Dodart* had asked the surgeon *Antoine Maître-Jan* to give his opinion on cataract and the operation for it. *Jean Méry* read *Antoine Maître-Jan's* reply before the Academy during the session held on 17th February 1706 [10]

On 17 February 1706 and based on these facts, the Academy made the following statement: "The general opinion of the Society appeared to be contrary to that of Messrs Antoine and Brisseau. The most decisive reason for this is that there are persons who are able to see even without the use of a magnifying glass after the cataract operation and, consequently, these persons have not had their crystalline lenses pushed down" [12] (FIG. 5).

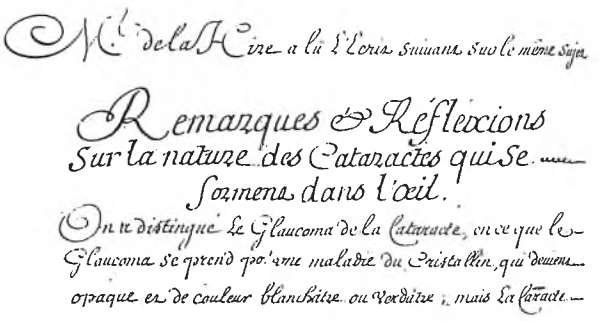


FIG. 5. Following the reading of *Antoine Maître-Jan's* letter to the Academy on the 17th February 1706, the physicist *Philippe de La Hire (Senior)* defended the traditional concepts using the argument that glaucoma is an incurable disease and that operating on the crystalline lens caused irremediable blindness [11]

The Year of Doubts (1707)

In 1707, at the beginning of the following year, there appeared the treatise of *Antoine Maître-Jan*. The author had forwarded a copy of this to the Academy, accompanied by a detailed letter in which he repeated the arguments stated in his letter of the previous year. This time, however, he illustrated the arguments with clinical case histories and gave results of his dissections of the eyes. The most striking example given was that of a female whose cataracts he had successfully couched in both eyes, enabling her to see normally. She died a month after the operation. *Maître-Jan* removed her eyes, dissected them, and found that vitreous occupied the place of the crystalline lenses which were located "in the lower part of the uvea", under the iris and attached partly to the ciliary body. The lenses were opaque and of brown color. *Maître-Jan* had also observed other patients in which cataracts had risen up after couching, appearing in the form of "large round and white bodies" which did not have "the shape of membranes" [13] (FIG. 6).

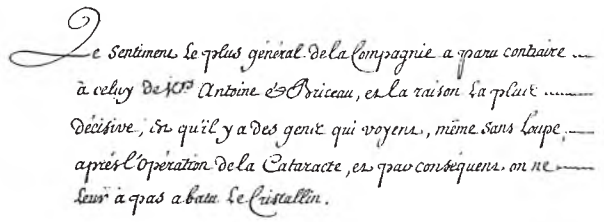
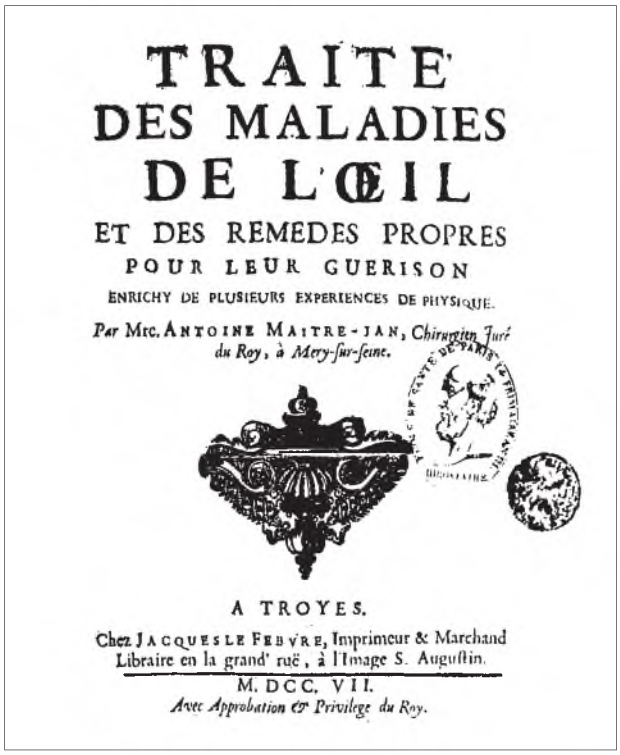


FIG. 6. After the reading of *Antoine Maître-Jan's* letter and of *Philippe de La Hire's* presentation, the Academy made a solemn declaration that its "opinion was not in agreement with the opinions of Messrs Antoine and Brisseau" [12]

In the course of May 1707, the records mentioned that members of the Academy had been present at two sessions of dissections of eyes: the first one was by *Jean Méry* and the second by *Littré*. The latter brought the eye of a 22-year-old male who gave a long history of cataract. After opening the cornea, there was evidence of "a fine opaque membrane, attached to the whole interior circumference of the iris and which totally occluded the pupillary orifice. The crystalline lens was transparent". After this observation, the academicians still remained convinced that the cataract was a membrane (FIG. 7).

On the 27th August 1707, *Méry* presented a summary of the known observations. He brought together all observations contrary to the 'new hypothesis':

— That of a male patient of the town of Sedan, in whom a transcorneal extraction of the crystalline lens from the anterior chamber did not restore vision.



TRAITE
DES MALADIES
DE L'ŒIL
ET DES REMEDES PROPRES
POUR LEUR GUERISON
ENRICHY DE PLUSIEURS EXPERIENCES DE PHYSIQUE.
Par Mre. ANTOINE MAITRE-JAN, Chirurgien Juré du Roy, à Mery-sur-seine.

A TROYES.
Chez JACQUES LE FEBVRE, Imprimeur & Marchand Libraire en la grand' ruë, à l'Image S. Augustin.
M. DCC. VII.
Avec Approbation & Privilege du Roy.

FIG. 7. At the time of publication of his *Treatise on Diseases of the Eye and the Correct Treatments for their Cure* (Traité des Maladies de l'Oeil et des Remèdes propres pour leur Guérison), *Antoine Maître-Jan* had forwarded a copy to the Academy of Science who received this on February 1707. He had enclosed a letter, which was read by *Jean Méry* during the sessions of Saturday 26th March and Wednesday 30th March 1707 [13]

— That of the dissection of an eye by *Littré*, which shoved an opaque membrane across the pupil and a transparent crystalline lens behind it.

— That of a 'priest in humble economic circumstances', whose membranous cataract lens had been pushed down, but had risen and passed into the anterior chamber, where one could see that it was not a lens but a real membrane, like a skin.

— Finally, that of a female patient who had glaucoma and who died at l'Hôtel-Dieu Hospital. At dissection, the aqueous humor did not run out of the anterior chamber because of a complete adhesion between iris and the glaucomatous lens.

Méry concluded from these cases that the traditional opinion of the establishment was correct and that of the 'new hypothesis' was false. Couching of the lens is a dangerous error, since this act deprives patients of his vision that is located in the crystalline lens. *Méry* expressed nevertheless some doubts since *Antoine* had reported that his patients recovered their sight after couching the crystalline lens and that, in the case of the female quoted in his treatise, this author had found the crystalline lenses to be positioned at inferior part of the eye.

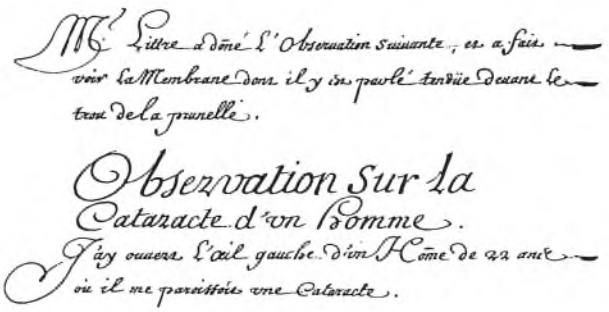
In addition, *Méry* drew several other interesting conclusions:

— A cataract or a 'glaucoma' located in the anterior chamber can be extracted by an incision through the cornea, the aqueous humor reforms quickly, and the cicatrisation of the cornea occurs without optical consequences if the incision is carried out in the peripheral cornea.

— One should not remove a too strongly attached membrane from the iris because of the risk of tearing the latter.

— Aqueous humor is secreted in the posterior chamber by "minute glands joined to the ciliary fibers".

Several months later, on the 7th of December 1707, *Gabriel-Philippe de La Hire (Jr)* gave a communication to the Academy in which he informed the members that he had recently been present at the couching of a cataract by the oculist *Woolhouse* and that he had witnessed "a hard white membrane". As soon as this membrane was pushed down, the patient saw the objects that one presented him. He also examines the ancient hypothesis that mixing of aqueous with vitreous created disturbances of refraction. By mixing the vitreous of an ox's eye with aqueous in an artificial eye, he did not find any notable changes in the luminous rays of light. He concluded that a person with a depressed crystalline lens could see, if he used a convex lens [16, 17, 18] (FIG. 8).



Observation Sur la
Cataracte d'vn Homme.

FIG. 8. During the month of May 1707, the academician *Alexis Littré* demonstrated before the Royal Academy of Science a dissection of the eye of a 22-year-old male affected by 'cataract'. He convicted the academicians that cataract consisted of a membrane

Fontenelle, the secretary of the Academy, in the course of compiling the papers published in the year 1707, pointed out the contradictions between the observations of the academicians and those of *Antoine* and *Brisseau*. The fact that *La Hire* had demonstrated that it was possible to see without a crystalline lens, was in favor of *Antoine's* observation:

"but it does not follow that one always pushes down the crystalline lens when one believes [one is] depress-

ing the cataract, that is not credible after what Littré had demonstrated to the Academy" [19, 20] (FIG. 9).

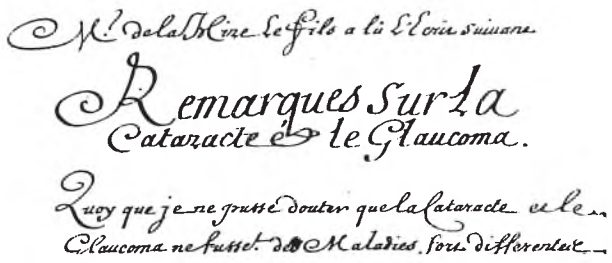
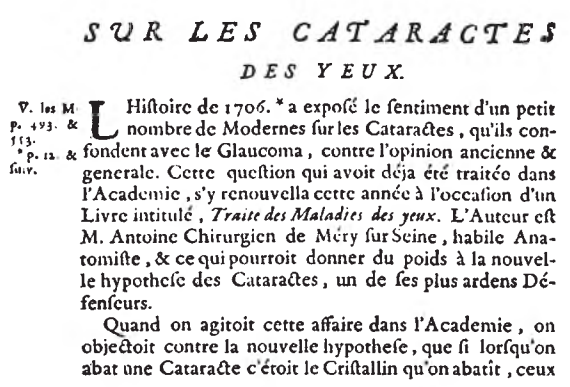


FIG. 9. On the 7th December 1707, *Gabriel-Philippe de La Hire Jr.* informed the Royal Academy of Science that he had recently been present at the couching of a cataract performed by *Woolhouse*, the oculist. The latter had convinced *Gabriel-Philippe* that there probably existed a 'hard white membrane' and that, as soon as this membrane had been excised, the patient was able to see those objects that were presented to him [16]



SUR LES CATARACTES
DES YEUX.

V. les M. P. 493. & 513. * P. 12. & suiv.

L'Hiſtoire de 1706. * a expoſé le ſentiment d'un petit nombre de Modernes ſur les Cataractes, qu'ils confondent avec le Glaucoma, contre l'opinion ancienne & generale. Cette queſtion qui avoit déja été traitée dans l'Academie, s'y renouvella cette année à l'occaſion d'un Livre intitulé, *Traite des Maladies des yeux*. L'Auteur eſt M. Antoine Chirurgien de Méry ſur Seine, habile Anatomiſte, & ce qui pourroit donner du poids à la nouvelle hypotheſe des Cataractes, un de ſes plus ardens Défenſeurs.

Quand on agitoit cette affaire dans l'Academie, on objectoit contre la nouvelle hypotheſe, que ſi lorſqu'on abat une Cataracte c'étoit le Criſtallin qu'on abatit, ceux

FIG. 10. When he was compiling the papers for the year 1707, *Fontenelle*, at that time permanent secretary to the Academy, recorded the discrepancies between the observations made by the academicians and those by the surgeons *Antoine Maître-Jan* and *Michel Brisseau* [19]

The Year of the New Certainties (1708)

The Register of the Proceedings of the Academy for the first months of the year 1708 does not contain any significant new pieces of information, except for the January reading of a new letter from the oculist *Woolhouse*, pleading in favor of the hypothesis of the 'Ancients'. However all that changed on the 20th of June 1708. The Proceedings of that date carried the enigmatic statement: "Two significant facts under consideration were examined in relation to the question of cataract about which Mr. Méry will give a report". It was the dissection of the eye of a deceased man whose cataract had been couched. After opening the eyeball, the academicians were astounded to find not a 'membranous cataract', but a "opaque glaucomatous crystalline lens in the lower part of vitreous" [21] (FIG. 10).

On the 27th of June 1708, *Méry* delivered a communication entitled, *Concerning Cataract and Glaucoma* (De la Cataracte et du Glaucoma). He reviewed his presentation from the previous year. He had, however, recently changed his opinion because of two pieces of evidence:

— First of all, there was the follow-up of the priest whose cataract had been depressed but later passed into the anterior chamber and was believed to be a membrane like skin. In the presence of *Méry* and the oculist *Charles de Saint Yves,* the surgeon *Jean-Louis Petit* had operated on this eye. Through a incision in the cornea, he withdrew this alleged membrane. The assistants recognized that it was, in fact, an opaque crystalline lens.

— Secondly, Mery recalled the dissection performed at the Academy during the previous week. In this eye, with the depressed so-called membranous cataract, the academicians were able to note that it was not a membrane, but an opacified crystalline lens that had been pushed into the vitreous.

Méry acknowledged that he had been mistaken. He recognized that, "one can, without risk, depress the glaucomatous crystalline lens, in consideration of the fact that vision is recovered after the operation" [22] (FIG. 11).

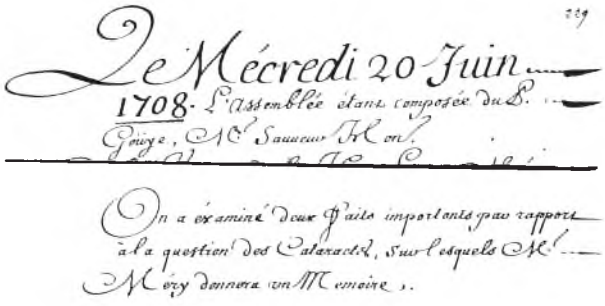


FIG. 11. On Wednesday 20th June 1708, *Jean Méry* dissected before the academicians the ocular globe of a dead male whose cataract had been couched. On opening of the ocular globe, the members of the Academy were astonished not to find a '*membranous cataract*' but rather '*an opaque glaucomatous crystalline lens*' located in the inferior vitreous [21]

On June 27, 1708, in the course of the same session, *Gabriel-Philippe de La Hire jr.* presented under the title, *Observations on Cataract and Glaucoma* (Remarques sur la Cataracte et le Glaucoma) an optical interpretation of the 'new hypothesis' concerning cataract. He confirmed that neither the mixture of aqueous humor with vitreous, nor the vacant space left by the depressed crystal-

line lens created a diffraction abnormality. Next, on an artificial eye made of a glass sphere filled with liquid, he also demonstrated that a convex spectacle lens is able to focus the rays in the eye and therefore supplant the loss of the crystalline lens [23] (FIG. 12).

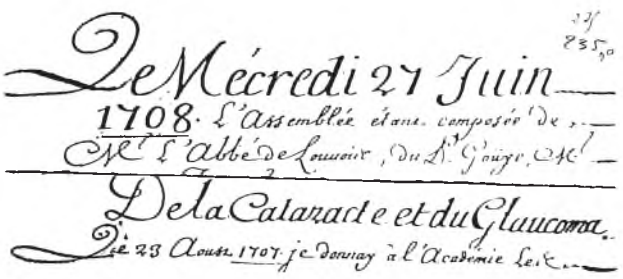

Mécredi 27 Juin
1708. L'assemblée étant composée de
De la Cataracte et du Glaucoma.
Lû le 23 Août 1707. je donnay à l'Académie Le

FIG. 12. On 27th June 1708, *Jean Méry* read a presentation with the title, *On Cataract and Glaucoma* (De la Cataracte et du Glaucoma). He admitted that he had been mistaken in his previous statements and that one could push down a "glaucomatous crystalline lens without danger, in view of the fact that the vision did recover after the operation" [22]

Finally, *Fontenelle* summarized the new position of the Academy, as follows: "one can see without the crystalline lens, i.e. without what had always ('toujours') passed for the principal instrument of vision" [24] (FIG. 13).

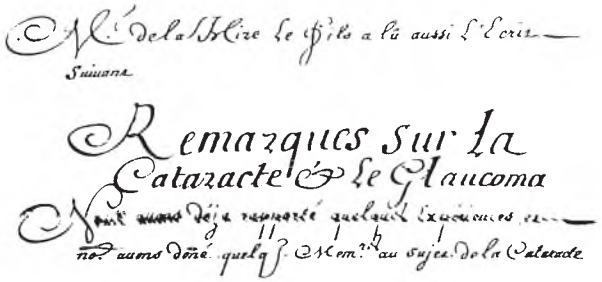
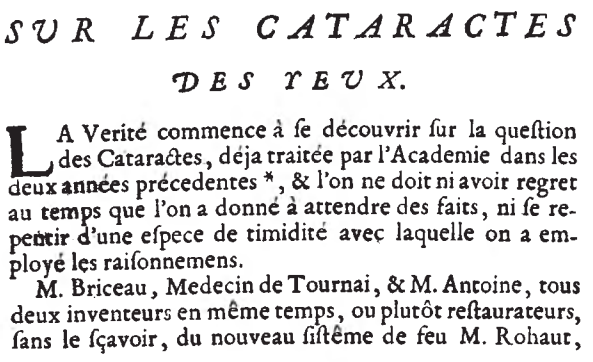

Remarques Sur la
Cataracte & le Glaucoma

FIG. 13. During the Royal Academy session held on 27th June 1708, *Gabriel-Philippe de La Hire (Junior)* described the optical aspects integral to the new hypotheses on the causation of cataract and used an artificial eye to demonstrate that a convex lens has the capability to replace the crystalline lens [23]

In the year following 1709, *Brisseau*'s treatise was published. Once again *Méry* dissected before the Academy the eyes of a man afflicted by cataract. The academicians were able to verify that the crystalline lenses were opacified. This convinced the last of the skeptics. Only the oculist *Woolhouse* continued not to believe the evidence. He had been invited to the dissection, but he excused himself [25] (FIG. 14).


SUR LES CATARACTES
DES YEUX.

LA Verité commence à ſe découvrir ſur la queſtion des Cataractes, déja traitée par l'Academie dans les deux années précedentes *, & l'on ne doit ni avoir regret au temps que l'on a donné à attendre des faits, ni ſe repentir d'une eſpece de timidité avec laquelle on a employé les raiſonnemens.

M. Briceau, Medecin de Tournai, & M. Antoine, tous deux inventeurs en même temps, ou plutôt reſtaurateurs, ſans le ſçavoir, du nouveau ſiſtême de feu M. Rohaut,

FIG. 14. In 1708, *Bernard Fontenelle* summarized the new position of the Academy "one can see without the crystalline lens, i.e. without what had always (toujours) passed for the principal instrument of vision" and thus corrected his presentation of 1706 [24]

Discussion

The Registers of the Proceedings of the French Royal Academy of Science for the years 1705 to 1708 made it possible to reconstitute the debates that led the Academicians to revise the century-olds concepts concerning the anatomical position and nature of cataract, the vocabulary, the ocular physiology and the concept of cataract surgery. The members of the Academy recognized that:

— Cataract is not a membrane stretched across the pupillary space in front of the crystalline lens, but is in reality the actual opacified crystalline lens;

— Starting from 1708, the term 'cataract' would be used to indicate the opacified crystalline lens;

— What was always known by the term 'cataract' is, if fact, a residual post-inflammatory membrane that nowadays is recognized as pupillary synechiae;

— The term 'glaucoma' that was previously attributed to an opacified crystalline lens was henceforth deemed unsuitable for this use. (It first persisted to designate an opacification of the vitreous associated with a greenish color in the pupillary area, then, after *von Graefe*, for the pathology linked to intraocular hypertension),

— Vision is possible without a crystalline lens, which had always previously been thought to be the principal organ of sight,

— The aqueous humor is secreted from behind the iris and circulates towards the anterior chamber,

— Mixing aqueous with vitreous did not produce refractive abnormalities,

— An eye without a crystalline lens or with a depressed crystalline lens is able to see clearly with a convex glass,

— By couching the cataract, one pushes the opacified crystalline lens into the vitreous,

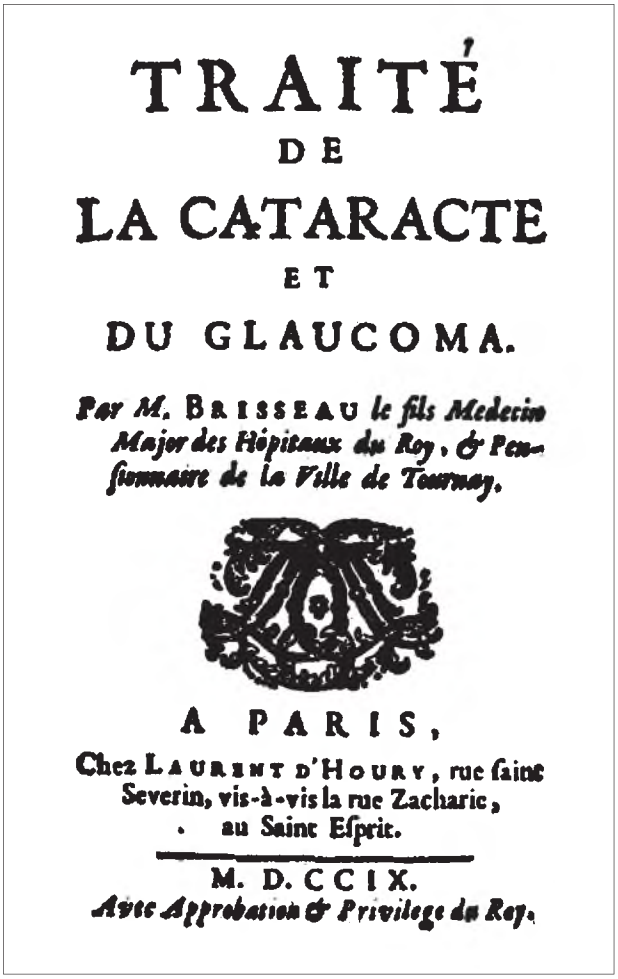

TRAITÉ
DE
LA CATARACTE
ET
DU GLAUCOMA.
Par M. BRISSEAU le fils Medecin Major des Hôpitaux du Roy, & Penſionnaire de la Ville de Tournay.
A PARIS,
Chez LAURENT D'HOURY, rue ſaint Severin, vis-à-vis la rue Zacharie, au Saint Eſprit.
M. D. CC IX.
Avec Approbation & Privilege du Roy.

FIG. 15. Cover page of the *Treatise on Cataract and Glaucoma* (Traité de la Cataracte et du Glaucoma) of Michel *Brisseau* published in 1709 [25]

— A crystalline lens luxated into the anterior chamber can be extracted through a corneal incision without risk.

Conclusions

The French Academy of Science is sometimes portrayed as an assembly of conservatives defending traditional concepts. The debates on cataract and glaucoma demonstrate that this description is incorrect. On the contrary, one can admire the intellectual flexibility and the adaptability of the academicians and the fact that, within only a period of three years, they modified their opinions. There is no doubt that *Jean Méry* played a key role in this development of ideas. He did not shy away from admitting that he was not mistaken nor did he fail to let it be known that he had changed his opinion.

Unfortunately, the new positions taken by the Academy did not receive the approval either from the scientists in other countries or from the travelling oculists who defended the traditional arguments. New research was necessary including that of the academician *François-Pourfour du Petit* and above all from a new generation of oculists that included *Jacques Daviel*. Only then would all traditional ideas on cataract be finally abandoned [26, 27].

References

1. De La Hire Ph., *Remarques et Réflexions sur la Nature des Cataractes qui se forment dans l'Oeil* [in:] *Records of the Proceedings of the French Royal Academy of Sciences for the Year 1706, Session of Wednesday 17th February 1706*, 25, 52 verso–55 recto.

2. *La Hire, Philippe de (1640–1718).* Mathematician, astronomer, physicist. In 1707 he was opposed to the 'new theory' of cataract.

3. Heitz R.F., *The Earliest Visualization of the Living Eye's Fundus by Immersion in Water, Arch. Hist. i Fil. Med.* 2012, 75, 11–15.

4. Heitz R.F., *Jean Mery's Neutralization of Corneal Diopter Power in a Living Eye* [in:] Heitz R.F. *The History of Contact Lenses*, Volume One, *Early Neutralization of the Corneal Dioptric Power*, 155–201, Wayenborgh Publishing, Oostende 2003 (ISBN 10:90-6299-300-1).

5. *Brisseau, Michel (1676–1743).* French physician, and senior surgeon to the Royal Hospital in Flanders. He sent several observations to the French Academy of Science, claiming in 1705 for the first time that pushing down of the cataract pushing down the crystalline lens and not of a membrane. In 1709 he summarized his observations in a book. In 1712, he became Professor of anatomy and surgery at the University of Lille and a reputed eye-surgeon.

6. Dodart D., *Dodard a lu une lettre de M. Bisseau* [in:] *Records of the Proceedings of the French Royal Academy of Sciences for the Year 1705, Session of 18th November*, 24, 349 verso.

7. *Dodard, Denis (1634–1707).* French physician, professor at the School of Pharmacy in Paris. Most of his scientific activity took place within the framework of the Academy des Sciences of which he was a member.

8. *Maitre-Jan, Antoine (1650–1725).* French surgeon living in Méry-sur-Seine. He wrote in 1706 a letter read before the Academy by Jean Méry in which he maintained that cataract results from opacification of the crystalline lens. In 1707 he published his *Traité des Maladies de l'Oeil*, whith sections of ocular anatomy and physiology, including a description of the camera obscura, reflexion of light and its refraction. This caused the Academy to change his traditional opinion and to accept the 'new theory' of cataract.

9. *Méry, Jean (1645–1722).* French anatomist and surgeon at Hôtel-Dieu and Invalides Hospitals in Paris. In 1684 Méry

was elected to the Academy. From that time onwards he devoted himself with great assiduity to this function. The Register of Proceeding mentioned that Méry had brought eyes to the Academy and had found a crystalline lens that was becoming opaque. This convicted the Academy to adopt the 'new theory'.

10. Méry J., Antoine M-J,. *Sur les Cataractes des Yeux* [in:] *Records of the Proceedings of the French Royal Academy of Sciences for the Year 1706, Session of Wednesday 17th February*, 25, 49 verso.

11. De La Hire Ph., *Remarques & Réflexions sur la Nature des Cataractes qui se forment dans l'Oeil* [in:] *Records of the Proceedings of the French Royal Academy of Sciences, Session of Wednesday 17th February*, 25, 52 verso–55 recto.

12. Fontenelle B.B., *Le Sentiment le plus général de la Compagnie* [in:] *Records of the Proceedings of the French Royal Academy of Sciences, Session of Wednesday 17th February*, 27, 55 recto.

13. Maitre-Jan A., *Traité des Maladies de l'Œil et des Remèdes propres pour leur Guérison, enrichi de plusieurs Exemples de Physique*, Jacques Lefevre, Troyes, 1707.

14. Littré A., *Observations sur la Cataracte d'un Homme [in:] Records of the Proceedings of the French Royal Academy of Sciences for the Year 1707, Session of Saturday 28th May*, 26–1, 208 recto–208 verso.

15. *Littré, Alexis (1658–1725)*. French physician and anatomist, member of the French Royal Academy of Sciences, author between 1700 and 1720 of numerous communications relatives to pathological anatomy. He dissected in 1707 a 'cataract eye' with a clear crystalline lens before the Academy.

16. La Hire G-Ph., *Remarques sur la Cataracte & le Glaucome* [in:] *Records of the Proceedings of the French Royal Academy of Sciences for the Year 1707, Session of 7th December*, 26–2, 426 recto–427 verso.

17. *La Hire, Gabriel-Philippe de (1677–1714)*. Eldest son of Philippe de La Hire, studies anatomy, astronomy and architecture. As member of the Academy he approved in 1708, in opposition to his father's opinion, the 'new theory' and presented the demonstration that an eye deprived of the crystalline lens could have vision.

18. *Woolhouse, John-Thomas (1666–1733)*. English oculist, surgeon to the Hôpital des Quinze Vingts in Paris for many years. In the topic of the true nature of cataract he stuck to the views of the ancients and would have nothing to do with the 'new theory' of the French Academy of Sciences.

19. Fontenelle B., *Sur les Cataractes des Yeux* [in:] *Histoire de l'Académie Royale des Sciences pour l'année 1707*, Jean Boudot Paris, 1709, 22–25.

20. *Fontenelle, Bernard le Bouvier (1657–1757)*. French philosopher and writer, named Permanent Secretary of the Academy of Sciences. For his prefaces and famous commentaries in the Transactions of the Academy, he is considered to be the first philosopher of the Century of Light.

21. Fontenelle B., *On a examiné deux faits importants par rapport à la question des Cataractes* [in:] *Records of the Proceedings of the French Royal Academy of Sciences, Session of Wednesday 20th June 1708*, 27, 229.

22. Méry J., *De la Cataracte et du Glaucoma* [in:] *Records of the Proceedings of the French Royal Academy of Sciences, Session of Wednesday 27th June 1708*, 27, 235 recto–238 recto.

23. La Hire, G-Ph., *Remarques sur la Cataracte & le Glaucoma* [in:] *Records of the Proceedings of the French Royal Academy of Sciences, Session of Wednesday 27th June 1708*, 27, 238 recto–241 verso.

24. Fontenelle B., *Sur les Cataractes des Yeux* [in:] *Histoire de l'Académie Royale des Sciences pour l'année 1708,* Jean Boudot, Paris 1709, 39–40.

25. Brisseau M., *Traité de la Cataracte et du Glaucoma*, Laurent d'Houry, Paris 1709.

26. *Petit, François-Pourfour du (1664–1741)*. French anatomist and surgeon, elected in 1722 member of the Academy, he is known for a number of discoveries including that of the 'Petit's canal', which is the space between the anterior and posterior suspensary ligament of the crystalline lens. Between 1723 and 1730, Petit worked particularly on the mechanism of the operation pushing downwards the cataract. He used frozen eyes for measuring the size of anterior and posterior chambers of the eye and for the best point one should incise the eye when needling the eye.

27. *Daviel, Jacques (1693–1762)*. French physician and surgeon. He was the first, in 1745, to extract a crystalline lens through a cornea incision. He presented his method in 1752 to the French Academy of Surgery.