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A

# TREATISE

OF THE

# CATARACT

AND

# GLAUCOMA:

IN WHICH

The specific Distinctions of those two Diseases, and the Existence of membranous Cataracts, are clearly demonstrated.

WITH

A plain Description of the Methods of operating in all Circumstances of either Distemper, and the Treatment requisite both before and after the Operation.

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Compiled from the Dictates of the late Learned and Ingenious Mr. WOOLHOUSE, as taken from him in writing,

By one of his PUPILS.

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L O N D O N :

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TRIFLE

OR THE

CATALAN

AND

THE

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THE  
PREFACE.

**T**O the learned and curious, who are acquainted with the merit and reputation of the late Mr. *Woolhouse*, it is presumed there can be no need to say any thing in recommendation of a treatise on this subject, that comes originally from him. The character of having had a most consummate skill in his profession, obtained from a long course of both his father's and his own experience, and a diligent study of all the great masters of antiquity, will hardly at this time, when the disputes he was so long engaged in are subsided, be denied him by any person of candour.

What those disputes were, the following sheets will sufficiently teach. They will let the reader see, that at a time when almost the whole current of theory and practice



## P R E F A C E.

ran against him, he ventured to assert and explain the doctrine of the antients concerning Cataracts and Glaucomas, and to shew that some of the former, contrary to what the moderns had believed, were in reality,—not true membranes, as some of his antagonists affected to interpret them,—but, as he used to express himself, membranous bodies.

One would have thought, that so many instances as he brought in support of his doctrine, attended with circumstances that were by no means equivocal, would have been sufficient to convince all mankind, and to have exploded the new hypothesis, which made all Cataracts to consist of an opacity or induration of the chrystalline humour. But the contrary happened in this case, as it has too often done in many others with regard to the treatment of the human body: prejudice was too mighty for reason, and a system imbibed very unwillingly gave way to observation and experiment. His own pupils, and some few others, instructed by them, admitted the truth, and suffered it afterwards to influence their practice, which in proportion was attended with success. But the major part of the oculists went on in the beaten track, according to what themselves had before either read or written.

Hence it has happened, that great numbers of chrystallines have continued to be  
deposed,



## P R E F A C E.

deposed, under the name of Cataracts, with a pretended view of recovering sight to the patients; when in fact the cases were truly Glaucomatic, and absolutely incurable in that sense. But Mr. *Woolhouse* would have taught the operators to have distinguished nicely in all those cases, and prevented their putting thousands to long and exquisite pains in hopes of an effectual cure, when the most they ought in justice to have been flattered with, was a little palliation, and seemliness restored to the organ: advantages which very few would perhaps think it worth suffering in order to obtain, if even these were always certain!

But it may be thought superfluous to dwell any longer, in the Preface, upon a subject of which the treatise will give a so much better account. What has been said is only to assign a reason for this publication, which aims at reforming the present practice, and restoring credit to the profession of an oculist.

As to the thoughts that are thrown together in this work, they were taken in writing from the mouth of Mr. *Woolhouse* at *Paris*, by a practitioner who went thither, above twenty years ago, on purpose to attend the lessons of that great man. They should have been published just as delivered, in his own person, had it not been impossible, in this manner, to put them down  
with

## P R E F A C E.

with an exactness fit for the press; and had not the teacher's long disuse of his own language, obliged him sometimes to convey his ideas with a mixture of *French*. But as form makes no considerable difference, and the compiler has endeavoured to do justice to his master's sentiments, by expressing them in plain and intelligible language, he hopes his attempt to serve the public will be kindly received.



T H E



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T H E

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## E R R A T A.

- PAGE 10. line 18. read *Dodart*.
- P. 12. l. 3. r. a professor.
- P. 26. Note l. 1. r. used.
- P. 42, 43. r. *Albucasis*, and for *humori*, *humore*.
- P. 59, 61. r. *Plempius*.
- P. 67. l. 8. r. by the quacks.
- P. 68. l. 6. r. called *vacuum* or *inane*, by *Celsus*.
- P. 108. l. 23. for water, r. winter.





A

# TREATISE

OF THE

## *Cataract and Glaucoma.*

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### CHAP. I.

#### *Definition of a Cataract.*

**C**ATARACT is a *Greek* word, that signifies primarily [*a*] a *break*, or *abrupt descent* in the course of a river, down which the water precipitates. It is also used for a *flood-gate*, or *port-cullis*, whose intervention hinders

[*a*] Καταρακτις, Locus abruptus & præceps in flumine, unde aqua præceps ruit; vectis, obex, porta. *David*, in the septuagint version, makes use of it in the Psalms according to the first sense. Thus we say the

hinders the communication of waters from one channel to another. In this latter sense it expresses very fully the nature of the distemper we are to describe, which is a foreign heterogenous body, intervening between the watry humour and the two different regions of the eye, and thereby hindering their communication.

Our *English* Authors, since the time of *William* the conqueror, make use of an old *Norman* phrase to express the operation for the cure of this distemper, which has been long altogether out of use in *France*. To *couch the Cataract* is an expression that prevails from custom, rather than from any distinct idea we affix to it in the utterance [b.]

*Galen*

Cataracts of the river *Nile*, which are also called *Catadupes* (καταδουποι) from the loud noise the waters make in their fall down those precipices. But when applied to the eye it never meant a defluxion in this sense, nor did the most antient *Greek* authors ever use the word to signify the distemper in question. It is in the *Arabic* translations, of *Hippocrates* and *Galen*, that we first meet with *Cataract*, *descensus aquarum*, where it is a sort of equivocal expression. But some of those writers call the same disease *Gutta Obscura*, in contradistinction to the *Gutta Serena*, another disease of the eyes, in which nothing appears in the eye-ball; whereas in the *Cataract* the eye-ball is always obstructed, or *sluiced up*, with an extraneous body of some different colour from the natural.

[b] Perhaps the original phrase might be, *Faire coucher le Cataract*, to make the *Cataract* fall, or to depress the *Cataract*: which operation the *French* at present call

*abattre*



*Galen* always calls this operation *Parakentesis* [c], a *punction*, as he does the instrument with which it is performed *Parakenteterium*, and the operator *Parakentetes*: which words are at this day appropriated solely to the operation for the dropsy, called in *English*, *tapping*.

It is observable of this antient, that, though he is singular in the name, he is so explicit in his description of the operation for the *Cataract*, that he leaves us no doubt but the doctrine we shall advance is agreeable to the practice of those times [d]. He tells us that the oculist places the needle in a great cavity, wherein it is seen to work above and below, to the right and to the left, and all manner of ways, without hurting (says he expressly) the iris on the one side, or the chrystalline on the other.

The specific term in *Greek* for this operation, is *Kenembatesis* [e], passing through the void, because the needle enters into the cavity of the eye. *Celsus* expressly explains the word, in the same chapter where he

*abattre le Cataract*, or *aguilleter le Cataract*. The latter may be very properly translated, *needle the Cataract*, the needle being the only instrument with which the Oculist here operates.

[c] Α Παρακεντεω, pungo, vel a laterē pungo.

[d] Vide *Galen* de usu partium.

[e] Α Κενεμβατεω, per inane gradior, ex κενος, vacuus, & εμβατεω, gradior.

minutely describes the operation, and in both he agrees well with our system.

*Hypochyma* [*f*], or *suffusion*, is another *Greek* appellation made use of by the ancients for this distemper, which is always seated under the pupil. They likewise call it *Parekchysis* [*g*], a word yet rather more expressive, signifying a fusion near the pupil, or apple of the eye: thereby intimating, that the Cataract is always about the rim of the iris. None of these great men ever pretended (what some modern authors would have us believe) that the Cataract is a concretion of the natural watry humour of the eye. They indeed call it a congelation, or condensation of a *certain humour* [*h*]; by that definite expression excluding the watry humour, which if they had meant, they would have used the proper denomination.

In fine, all the names and definitions unite to teach us, that the Cataract is not a concretion of the watry humour naturally filtrated, but an adventitious body formed in that humour by some inlet of another, of heterogeneous quality. This *Molineux* perfectly well observed, and was the first who ever demonstrated how the Cataract is form-

[*f*] ὑποχυμα, ab υποχυω, suffundo.

[*g*] Παρεκχυσις, effusio humorum inter cutem.

[*h*] Πηξις ejusdem humoris.



## Cataract and Glaucoma. 5

ed, in a letter to the honourable *Robert Boyle*, Esq; printed at the end of his anatomy of an elephant. But that letter, by being writ in *English*, has not been sufficiently known to the learned abroad [i]. He shews us there pretty distinctly the several vessels, and has given us some figures, in which he has delineated, though imperfectly, the several proper ducts of the three humours. This discovery perfectly well agrees with all the definitions of a Cataract and a Glaucoma by the best *Greek* authors.

*Harvey* tells us, that in a Cataract the *vasa adducentia* of the watry humour are enlarged, and let out the humour while yet chilous and unprepared; so that these grosser particles remain floating in the prepared humour, and cannot be carried into the way of circulation by the *vasa abducentia*, which are not so affected. These little particles unite in process of time, and make as it were a membrane.

All the antients agree that the Cataract is *as it were* a membrane, and none of them

[i] *M. Ruifch* was however acquainted with it in *Holland*, and has built upon that piece a most excellent hypothesis, without ever mentioning the author, any more than if he had never wrote. He has much enlarged and improved the *Englishman's* drawings, and explained them to more advantage: but the honour of this great discovery should still remain to the original author.

call

call it a real membranous body, as some moderns pretend to have found it.



## C H A P. II.

### *Of membranous Cataracts.*

*History of the Disputes on that Subject to the Year 1720.*

**E**VER since *Paulus Ægineta's* time, there has been a dispute now and then raised, whether or no there was any such thing as membranous Cataracts. *Paulus* himself makes mention of this doubt, not as the result of his own opinion, but from the opinion of *Rufus of Ephesus* [k]: but there is no such thing in all the remaining works of *Rufus*: so that it is probable either this treatise of *Rufus* is lost, or that it was only a traditional hearsay from *Rufus's* time. As for *Ægineta's* own part, he con-

[k] The title of his chapter is clear: *de Diffusione & Glaucomate, ex Rufo*. This *Paulus* was a great collector, and rather valuable for what he has left us of others, than for what he discovered himself. Yet some improvements in the medical art seem to be due to him, which the reader may see enumerated in that valuable treatise of *Dr. Freind, The history of physic from the time of Galen to the beginning of the sixteenth century.*



## Cataract and Glaucoma. 7

demns the opinion very much, at the same time that he produces it.

*Actuarius*, after *Paulus*, makes mention of the same doubt; but imputes ignorance to them who are inclined to believe the Glaucoma and Cataract to be the same disease. *Galen* is very express in the matter; he [1] ascribes the Glaucoma only to the chrystalline humour, and says it is the worst and most incurable of all the diseases of the eyes.

This contrariety of opinions it is not very difficult to reconcile, especially when we read *Ætius* upon the matter, who is the only author among the *Greeks* that acquaints us, that all Cataracts may become Glaucomas in time.

Mr. *Geisler*, surgeon of the hospital of the *Holy Ghost* at *Nurenberg*, opened six eyes successively wherein Cataracts had been couched, some by himself, and others by another Oculist; and in two of those eyes, which recovered not their sight, the chrystalline humours were found yellow, and quite opaque. But membranous Cataracts that gentleman depressed to the bottom of the eye, between the inward part of the iris and the *processus ciliaris* [m.]

[1] In his Treatise *De usu partium*.

[m] This was conformable to the practice and instructions of Mr. *Woolhouse*, to whom Mr. *Geisler* had been a pupil at *Paris*, and to whom he communicated his observations and experiments.

Mr. *Woolhouse* made one experiment of this kind at *St. Germain en Laye*, in the hospital of *Madam de Montespan*, upon one *Gabriel Cox*, a man of above 60 years of age, who recovered his sight upon the operation: and his eye being opened by the same gentleman, after his death, the chrySTALLINE humour was found transparent, and in the natural place. This was therefore a true membranous Cataract, because cured by couching.

This old dispute, concerning the existence of membranous Cataracts, lay dormant till the last century, when an eye that had been couched was brought into that learned society, which afterwards formed the academy royal of sciences. It was there opened, and found without a chrySTALLINE humour; by which *Gassendus* and *Robault*, two great naturalists, concluded that humour to have been depressed in the operation, and that there had been no other Cataract but an opaque chrySTALLINE [n.]

But the learned world remained unacquainted with this experiment, as well as with the insinuation concerning *Rufus*, which was exploded as an ill-grounded tradition by the sophistry of oculists. It was

[n] *Abbé de Bourdelot* gives an account of this experiment in his *Conferences Academiques*, published in two volumes, before this company was honoured with the title of *Academie Royale*.



the interest of these men, in all ages, to confound Glaucomas and Cataracts together. It was but a prick of a needle, and they gained their money right or wrong, not waiting to have a judgment formed from the event : which could not be prosperous to more than one subject in twenty, because there are certainly twenty Glaucomas for one real Cataract. Ignorance, as well as avarice, might indeed have a great part in this popular error ; most of those that have called themselves oculists, from the time of *Justus*, who was contemporary with *Galen*, to our own days, having been illiterate persons, who performed that operation more by audacity than a true knowledge. Nay, the greatest part of them have been strollers, running from country to country like stage-players ; and becoming dextrous in that particular operation of the needle, as well as in lithotomy, and the amputation of cancered breasts, through the vast multitude of subjects that fall under their hands. Some parts of *Spain* are full of this sort of mountebanks, who quarter *Europe* among themselves twice a year, spring and fall, to make their harvest in these three operations [o.]

In

[o] Mr. *Woolhouse* knew one of these, who was famous in *France, England, and Flanders*, and so dextrous at sixty-eight years of age, that at full arm's length, he would run a needle thro' the same hole, that he had made in a card,

C

fifty

In the year 1707, M. *Maitre-Jean* presented to the academy of sciences some remarks he had made concerning Cataracts, wherein he pretended to be the author of a new discovery : he maintained, that all Cataracts were nothing else but what the schools of physick and surgery had always hitherto called Glaucomas. Mr. *Woolhouse* wrote a refutation of that system, which was read in the public academy, by M. *de la Hire*, professor of mathematicks ; and M. *le Clerc* gave an extract of that manuscript, in the twentieth tome of his *Bibliothèque Choisie*.

Some months after, Dr. *Brisseau*, physician of the royal hospital at *Tournay*, fell upon much the same system, and sent his remarks to Mr. *Doddard*, afterwards first physician to the *French* king, for his approbation. Mr. *Woolhouse* then wrote a refutation of both him and *Maitre-Jean* together, an extract of which was also published in the literary journals of those times [p.] His doctrine

fifty times together. Upon being asked how he became so exact and adroit, he answered naturally and honestly enough, that it was by bursting some bushels of eyes, he had pretended to couch. He was always very much dissatisfied with Mr *Woolhouse*, for making a specific distinction between the Cataract and Glaucoma, alledging, that he spoiled their trade.

[p] He complained of the usage of Dr. *Brisseau*, whom he called his friend and acquaintance, because that gentleman



## *Cataract and Glaucoma.* II

trine met with fresh confirmation from a cataracted eye, produced by an academician at *Paris*. In this eye there was visibly formed a sort of membranous body, obstructing the pupil, the chrystalline humour retaining its natural transparency.

All this while, it seems, neither of the new treatises was published; and one would have thought, after such printed answers had been given, and the hypothesis absolutely overthrown by an indisputable experiment, the authors of both would have thought proper to suppress their visions. But it happened otherwise: they ventured them into the world; and Mr. *Woolhouse* thought himself obliged to accompany them with his full refutation [q.]

After these publications, within a few years, Mr. *Woolhouse* had the corroborating evidence of no less than eighteen membranous Cataracts, all contra-distinct from Glaucomas. This did not, however, bring any disgrace upon Dr. *Brisseau*, who, upon his pretended new discovery, was made professor of physic and surgery at *Doway*.

gentleman never spoke to him of this pretended discovery, though he had seen him couch several Cataracts in *Tournay*, *Mons*, and *Condé*.

[q] This was printed at *Offenbach*, near *Frankfort* upon the *Mayn*, by one of Mr. *Woolhouse*'s disciples; the first edition in *French*, and the second in *Latin*.

The hypothesis of our *French* authors, having got into *Germany*, was abetted by professor of physick at *Altorf* near *Nuremburg*, who had several conferences with Mr. *Geisler* upon the subject, and printed three books [r] in defence of the new doctrine. But this author, like the rest, was soon refuted: numberless instances came in to expose and explode the newly revived error. Mr. *Woolhouse* had now to produce, besides his own experience, a public certificate from the university of *Padua*; another signed by six learned physicians, who were eye-witnesses of Mr. *Geisler's* operations at *Nuremburg*; the experience of *Hofman*, who wrote a valuable commentary on *Galen's* book *de usu partium*; the public case produced at *Paris*; three or four eyes anatomized by *Winslow*, and several others by *Bouquet* [s.]

The royal society at *London* continued silent upon this dispute [t.] A bad and

[r] In the last of these indeed he recants his opinions, and denies that he ever absolutely excluded membranous Cataracts; using *Woolhouse*, *Geisler*, and *Andry*, professor of physic at *Paris*, with ill language, for having given a truer account of his doctrine than he desired. But to see that this was pitiful shifting, his three pieces need be only consulted.

[s] For a particular detail of this matter, the *Paris* journal *de sçavans*, the memoirs of *Trevoux*, and those of physic in *Germany* may be consulted.

imper-



## Cataract and Glaucoma. 13

imperfect translation was indeed made of *Maitre-Jean's* treatise into *English*; but this was not sufficient to interest any person of reputation in the affair, and could only help, as Mr. *Woolhouse* used to express it, to make such another quack as *Read*, (who from a heelmaker became the king's oculist, without being able to write or read) or as some of his successors in reputation.

One *English* author however, in a little book entitled *Ophthalmographia* [*u*,] concerning about thirty diseases of the eyes, seemed to espouse the new hypothesis. Upon this treatise Mr. *Woolhouse* published some remarks in the *journal de sçavans*. There are also remarks of his in the same journal, and in his ophthalmic dissertations, upon Dr. *Coward's Ophthalmiatria* [*w*.].

To return from this dispute: all our ancient authors, *Latin*, *Greek*, and *Arabic*, agree in this, that both Cataracts and Glau-

[*t*] This Mr. *Woolhouse* wondered at, yet commended them for it.

[*u*] Printed in the year 1713.

[*w*] Printed in *Latin*, in the year 1706, before the revival of this dispute. This author, in general, seems rather to favour than oppose Mr. *Woolhouse's* hypothesis; by distinguishing between the true and the false Cataract, and insisting on the great judgment requisite in such cases. His true Cataract must be the membranous Cataract of Mr. *Woolhouse* and his disciples.

coma's

coma's may be at least stopped or fixed in their progress, when they are undertaken at the beginning of the distemper; and that Cataracts, when simple, are to be couched, and the sight is recoverable. *Pliny*, in his natural history, says, that many recovered their sight, after it had been lost by suffusion twenty years. *Grant*, in *London*, couched the Cataracts in both eyes of one of king *Charles II's*. footmen, after he had been blind thirty years, and when he was an hundred and five years of age, and perfectly restored his sight. *Mr. Bonnet*, one of the king of *Prussia's* surgeons, couched, while he was learning of *Mr. Woolhouse* at *Paris*, the eyes of a poor almswoman, who had been sixty-three years blind, and yet perfectly recovered; as it is attested by the public certificate of several ocular witnesses [x.]

[x] This case was printed by *Dr. Mangetus* of *Geneva*, in his new *Bibliotheca Chirurgica*, in 5 vols. in folio. In the same collection, among several other experiments, is one of *Mr. Woolhouse's* own making, upon a poor joiner of *Fême* in *Champagne*, who recovered his sight by couching, after he had been blind near fifty years.





C H A P. III.

*Of the several species of Cataracts,  
true and spurious, with their  
prognosticks.*

THE colour of Cataracts, which authors of all languages insist upon as making an essential difference in their species, are merely accidental, and generally speaking, contribute little or nothing towards the curability or incurability of the disease. However, a very dusty coloured Cataract, with black elevated streaks, somewhat resembling the *processus ciliaris*, is not to be meddled with in hopes of cure; because those rays are an infallible mark of damage done to the choroides, and to the ciliar fibre.

Cataracts of this kind are generally produced, either by a stroke on the eye itself, or by a violent blow on the head; or they may happen after an inveterate defluxion upon the eyes. The chrystalline humour, in these cases, is forced out of its sinus in the glassy humour; and very often the glassy humour itself is liquified, by a solution  
tion

tion of the coats between its little cellules. One easily perceives this by a touch of the finger's end ; the eye being soft and flabby. This single symptom, whenever met with, proves the case absolutely incurable, and renders fruitless every operation, as to the restoring of sight. Nay, even a palliative cure cannot here be effected, the globe being full of nothing but water, and having no fibrous parts remaining, nor entire tunics.

What has been frequently called a black Cataract in all nations, by some out of ignorance and quackery, by others out of baseness and interest, is also a disease utterly incurable. It is, in fact, nothing but what we call in *England* stark or stock blind ; an absolute privation of sight, by the obstruction of the optic nerve, without any visible change in the eye. This sometimes follows a Cataract that might first have been curable, but also frequently comes alone. But there is no kind of suffusion of this colour, obstructing only the sight of the eye ; as the itinerants of all nations pretend, on purpose to get money by the prick of their needle.

Monf. *Maitre-Jean*, who had the character of an honest man, is here much to be wondered at : for he tell us, that he once couched with success a black Cataract. There is, indeed, a sort of a lead-coloured Cataract, that generally happens to melancholy people,



## *Cataract and Glaucoma.* 17

people, which is couchable, and the sight has frequently been restored by the operation. Mr. *Woolhouse* himself once couched a Cataract of this kind, in the hospital *La Charité* at *Paris*, at the request of M. *Marechal*, in order to shew his son the operation.

The *Germans* call the Cataract the *Star*, and we often meet with, in old *English* books, the words *Star Blind*, to signify one blind of a Cataract. This disease does indeed much resemble the stars in their different colours; some being more, some less shining. But generally speaking, where there is least lustre, there is least hope of a cure; partly because the eye is not animated with sight under those Cataracts; and partly because the aqueous humour, in most such ill-colour'd Cataracts, does not flow into the different regions of the eye, or circulate duly, as where the orb is sound. On this latter account, the Cataract not uncommonly sticks to the chrystalline humour, and incorporates with it; so that there is no cavity for the needle to work in.

The plaister-colour'd Cataracts are much to be suspected for these reasons: Because you generally find the hole of the pupil shut up, and the iris does not float between two waters, as it naturally ought to do. The green are much of the same nature, as well as the yellow, or gold-colour'd, and the

lemon-colour'd. The latter are generally not true Cataracts, but Glaucoma's. And all that an oculist can do in these cases, is to attempt the palliative cure, by taking away the blemish in deposing the chrystalline.

The sea-colour'd Cataracts, and the pale olive-colour'd, are generally easy to be couched, and seldom or never rise again. In the operation, they fall down to the bottom of the eye by their own gravity, and there continue ever after.

The Cataract that is covered with white streaks, like the flesh of a man's body, and looks like the horn of a lanthorn, is generally very hard, cracks under the needle like a goose-quill, and will sometimes remount in the operation thirty or forty times. If the oculist here persist to make it remain depressed, though he may effect that, the hardness of the substance cuts and destroys the iris, or at least disengages it from the cornea, and makes the patient suffer intolerable pains, which seldom end but with the entire loss of the eye.

The brass-colour'd, the burnish'd iron-colour'd, the porphyry-colour'd, and the red Cataracts, do all prognosticate ill success, as to the re-establishment of sight. Most of them are followed by Gutta serena's, and are generally produced by some accident.

A Cataract of the colour of mother of pearl is generally suspected by all authors,  
who



## *Cataract and Glaucoma.* 19

who have wrote of this subject, as giving little prospect of good success. The reason they assign is, that the extraneous body is too hard for the operation: but the true reason is, that they are generally Glaucoma's, and not Cataracts. Mr. *Woolhouse* opened an infinite number of eyes, both of men and beasts, and found the distemper of that colour to be a Glaucoma. But several *French* physicians and surgeons, of great reputation, assisted at his operation upon one of them. The patient was one *Nicholas Bonnet*, a poor cobbler, living near the hospital of the incurables. The Cataract was neither hard nor elastic, though about eighteen years old. *Bonnet* recovered his sight perfectly well, and could read and write with a Cataract spectacle.

Cataracts of the colour of a *Turkish* stone, of pearl, of the firmament, of quick-silver, and all the different colours we perceive in the stars and moon, are in themselves curable, and the sight restorable: provided however, they are not produced by some violent cause, as a raging fever, great pains in the head, salivations, epileptic fits, fits of the mother, great loss of blood, wounds, piles, or the menses.

The antients were much of opinion, that Cataracts generally follow the temperament of the patient's body. 'The Atro-biliar, ' say they, have darkish, dusky, or black

‘ Cataracts : the choleric Cataracts are full of  
 ‘ lustre, either of gold, brass, citron, or other  
 ‘ similar colours :’ and so of the rest.— But  
 their rule is very faulty, and contradicted by  
 daily experience.

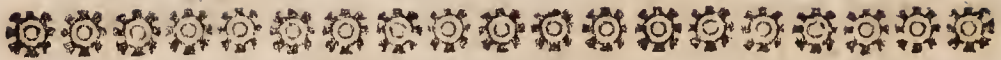
Cataracts differ likewise in their extension,  
 or quantity : for some traverse only the pu-  
 pil, like a bar ; others appear before it, like  
 the lettice before a window ; others are full  
 of rays, and let the patients perceive objects  
 through some parts ; some are suspended a-  
 bove only, like small globules, at the rim of  
 the iris ; others only below : some are to  
 the right, and some to the left, of the pu-  
 pil ; and others, again, are woven directly  
 in the middle, thereby hindering the sight  
 more or less, according as the Cataract is  
 small or large. All these sorts of Cataracts  
 are called partial.

There are likewise some excrescences of  
 the iris, that are liable to be mistaken for  
 Cataracts. All animals are more or less sub-  
 ject to them, as they are more or less expos-  
 ed to injuries that may produce such accidents.  
 Horses, of all beasts, are the most frequently  
 affected with them, on account of the blows  
 they receive from their merciless managers  
 on the head and eyes. These excrescences  
 are fungous substances, produced in the pu-  
 pil by the rupture or dilatation of the fibrous  
 vessels of the iris. Sometimes they appear  
 exceeding small ; at others, as big as a pep-  
 per-



per-corn. So that though the horse thus affected sees well enough in the stable, when the pupil is dilated by the obscurity of the place; yet when he comes into strong light, and the pupil is consequently contracted, he can see no more on that side.

Cataracts have a farther difference among themselves, in respect to their substance. Some are thin, like gauze, or a cobweb. These shall be coming on twenty or more years, before the patient entirely loses the sight of the affected eye. Others are so very thick all of a sudden, that in a fortnight's time the Cataract becomes couchable. Nay, there is not uncommonly such an influx of humours, that the morbid matter fills not only the second compartment of the eye, but passes through the pupil to the first region; and having at last no farther room, distends the globe prodigiously. All the remedy in this desperate case is, for the oculist to perform in the eye, so affected, the same operation as in the hypopyon, or in the empyema.



## C H A P. IV.

*Of the cause, form, and propagation of Cataracts: also an account of the Cloportes.*

**M**OST of the modern authors, especially for about three hundred years past, have assigned for the cause of the production of Cataracts, the coagulation or condensation of the aqueous humour of the eye. Their predecessors, however, were very express concerning the mixture of a heterogeneous matter as the efficient cause. In fact, it has been observed in both men and beasts, which have died of cold, that the aqueous humour has not been fixed, condensed, or frozen. This gave occasion to several learned men of the academy of sciences in *France*, to come altogether into the opinion of the antient *Greeks*, in opposition to the moderns, concerning the production of Cataracts.

But closer observation hath since shewn us, that the aqueous humour is easily congealed when taken out of the eye, and not covered with the eye-lids, but suspended

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*Cataract and Glaucoma.* 23

ed in the winter-season in the cold air : indeed the chrystalline humour is the first frozen in such cases, and appears like a true Glaucoma ; but recovers its natural transparency when placed near the fire : which shews the great disposition the chrystalline humour has to become opaque ; as we have seen in the *French* disease, where very frequently the patient grows blind of a Glaucoma during the progress of the distemper, but recovers his sight afterwards by the use of mercurial remedies.

Mr. *Woolhouse*, at the desire of a patient, tried the same remedies for the eyes only, where there was nothing of the other disease ; but without any manner of success.

Cataracts are generally of a round form : which gave occasion to Mess. *Brisseau* and *Antoine* to produce Glaucomas for Cataracts ; not reflecting, that it is very difficult for Cataracts to be of any other than an orbicular figure ; because their matter being mucilaginous, naturally assumes that figure, or is modeled into it in the second region of the eye, upon the chrystalline ; which, being moveable, sends it back to the pupil, which kneads (as it were) the paste of the Cataract, pressing it in on all sides towards the *ciliar processes*, which reject it again towards the outward fibres of the iris. So  
that

that all Cataracts must necessarily be round, unless some particular cause intervenes, to give them another figure and shape.

Sometimes Cataracts are hereditary, and propagated from father to son, *ex traduce*. The family of *La Seur* at *Paris*, in the royal hospital of *Quinze Vingt*, had, at the time of taking down these dictates, four generations blind of Cataracts; four sons of the same father all lost their sight at about thirty years of age; and the children of these, daughters as well as sons, had all the same misfortune. Mr. *Woolhouse* had known several such families, as well in *England* as in *France* [y.]

The

[y] He instances particular in M. *Boisenoir*, advocate of the parliament of *Roan*, whose Father he had couched, as well as himself, and his son had then a Cataract in one eye. Both the father and mother of M. *Boisenoir* the elder had died blind of Cataracts. Here then is another instance of four generations. “ I  
 “ have made it, says Mr. *Woolhouse*, amongst my fami-  
 “ ly observations, that women troubled with the falling-  
 “ sickness during their pregnancy, generally bring forth  
 “ children blind of Cataracts. I have seen at *Cou-*  
 “ *tance*, in the *Lower Normandy*, five Children of the  
 “ same father and mother born blind of Cataracts. I  
 “ have seen at *Paris*, three children of the same father  
 “ and mother born blind of Cataracts successively. The  
 “ father was troubled with the falling-sickness in the lat-  
 “ ter pregnancy, and the mother in the others. And  
 “ in the thirty-six different subjects I have cured that  
 “ were born blind, nine of their parents were troubled  
 “ now



## Cataract and Glaucoma. 25

The Glaucoma is likewise very frequently *ex traduce*. Mr. *Woolhouse* had seen many instances of it; and *Hippocrates* intimates the same thing, when he speaks of the colliquation made upon infants in the parts belonging to their brain and common sensory, either by fright, or by the epilepsy.

'Tis a common piece of quackery in all countries, to pretend to cure Cataracts, whether in their beginning or increased state, with topical remedies: though it is infallibly certain, that if any such cures have ever been performed, we ought to attribute them to mere chance, and not to any mechanical reasons, or natural effects of physic. For suppose a remedy penetrates through the horny tunic, without lodging in any of its different leaves, and comes into the first partition of the aqueous humour; its points must be blunted in the passage, and its farther proceeding obstructed. But if we farther suppose, for argument's sake, that they go directly on to the second region of the aqueous humour, and there act forcibly upon our Cataract; the most they can do will be to tear and rend it, which will be

“ now and then with the falling-sickness. The others  
“ were begot by old people, and generally the last of  
“ their children; except two, whose mothers were  
“ frightened when big with child, by their husbands lo-  
“ sing each an eye through the small-pox.”

far from effecting the cure. Nay, even suppose a Cataract could be dissolved in the eye; the parts of the Cataract, after dissolution, would never be so minute, as to enter into the way of circulation by the *vasa abducentia* of the aqueous humour: so that the patient would receive no advantage by this analysis, nor would the separated parts in time produce any good effects upon the chrystalline humour; which they would be rather apt to obscure and cover.

The only certain methods that have ever yet been found, from the time of *Hippocrates* down to this day, to hinder the progress of Cataracts, are, First, to let out the gross watry humour, by the operation of the parakentesis [z.] The second way of cure is taught by that great man, in his short treatise *de Visu*; wherein he declares, that the way to hinder the growth of Cataracts and Glaucomas, is to bar the arteries, either upon the temple, on the fore or hinder part of the ear [a.]

Mr. *Boyle* was the only man that ever found out a good internal remedy, either to dissipate Cataracts, or hinder their growth.

[z] This operation is said to be use in the *Indies*. Mr. *Woolhouse* had seen it practised in *England* also, by Dr. *Turberville*.

[a] Mr. *Woolhouse* had seen this operation frequently performed by *Guerin*, *Monie*, and *Bouvey*, French surgeons; and, he says, with very good success.



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It is by an insect called the *wild cloportes*, or *multipedes*; said by some to be the same as the *millepedes*, or *aselli*. In *English*, they are called *cheeselips*, *chesselbugs*, or *cheesebubbs* [b.]

They have thirty-two feet, and are to be found only in woods and forests, in the free air, generally about beech-trees. They are of all manner of colours, according to the soil they are in: but the most of them are of a shining brown chesnut, polished like fine tortoiseshell. Their body is composed of several rings, or articulations, which close over one another so fast, that one might easily mistake it for some polished pebblestone. Partridges and pheasants love them, and live mostly upon them.

But ignorance has imposed upon the world a substitute in the place of this excellent remedy: an insect which the *Latins* called *porcelliones*; the *English* call sows, or woodlice, and the *French*, puffillets. This is quite another sort of a creature, and has only twelve feet, with an anchored or forked tail, and long horns upon its head. There are several spe-

[b] *Etmuller* and *Schroder* say, they had very good success by the use of this insect. *Mr. Woolhouse* owned, that for his own part, he never found it dissipate one Cataract: but *Laly* and *Dechamp*, *French* surgeons, assured him, that the confessor of the nuns of *Malta*, at *Montpellier*, was cured of a full grown Cataract by the use of this single remedy.

cies of them : one found in cellars about the old timber, or in wine-vaults, which is very flat, and has a very ugly hobble in its motion : another kind called staggers, which may be met with in the clefts of walls, runs very fast a certain space, and then stops to begin a new course or stage. A third sort is found in dunghills, and about wells, as blue as a slate. The fourth kind is in pot-herb gardens, which is the most likely to cause deception. It will close itself as firm as the true millepedes when touched : but then it has only twelve feet, and is on the back of a dull blue complexion.

The true millepedes, when pricked, yields a liquor as clear as chrystal ; whereas all the other species, upon the same trial, yield a yellow stinking fluid.

The true way of taking these cheefelips, or bugs, or aselli, is either by swallowing them alive, or chopping them between the teeth, or bruising and taking them with some liquid. *Queen Mary*, the consort of the late king *James*, swallowed them alive, and used to say, she found them creeping up her throat again two hours after. She took them for a cancer in her breast, and was cured thereby. The antient way of taking them, by putting a pound weight to every pottle of hot wort, and so letting them work in a small vefsel, is imputed to Sir *Kenelm Digby's* discovery : but *Mr. Boyle* improved



## *Cataract and Glaucoma.* 29

improved upon *Digby*, and prescribed them with much more precaution, as well to retain all the virtues of the insect, as to prevent some inconveniencies that might otherwise attend the taking them. The chief of these is difficulty of urine, which is apt to accompany too large a dose: to avoid which, *Mr. Boyle* orders the patient to begin with a lesser number, swallowing them alive, and increasing the number every morning, as the constitution will permit.

Besides what we have mentioned, millepedes are excellent for asthma's, the king's-evil, the green-sicknefs, and the jaundice.

During the taking of this remedy, all milk meats must be avoided, as what may occasion a coagulation in the stomach, and bring on terrible gripes. All sorts of spiritous liquors, wine, strong beer, coffee, tea, or chocolate, are also dangerous in this course. And the want of proper precautions has brought on inflammations of the bladder, diabetes, diarrhœas, stranguries, and even bloody urine.

It works either by spitting, as mercury; or by urine, as an excellent diuretic; or by stool, as a cathartic. But the antients, who believed in particular signatures of plants, minerals, and animals, pretended that the true *ὄνισκος*, having its head and tail joined together, and becoming round like a bead, had a perfect resemblance of the apple of the eye;

eye; the ringlets on the outside of the body of this insect, and the thirty-two feet of the inside, resembling the different rays of the iris outwardly, and the *processus ciliaris* inwardly: and this gave the first occasion of using this remedy as a specific, in most diseases that depended upon the pupil [c.]



## C H A P. V.

*To know when a Cataract is ripe.*

**W**HEN neither *Hippocrates's* specific operation, nor the inward use of chesselbugs, will succeed in the dissipation of a Cataract, the oculist is obliged to remit the patient from spring to fall, and from the fall to spring again, till he finds the Cataract thoroughly ripe, and fit for operation: which is chiefly known by the following signs.

First, the pupil, instead of being black as jet, is quite of another colour, and particularly of one of the colours before-mentioned, which we see in looking at different

[c] Mr. *Woolhouse* used to refer those who would know more of this insect to a treatise he published concerning it, in the *journal de Trevoux*.



## *Cataract and Glaucoma.* 31

stars; the rays of the iris surrounding the pupil, like the rays of those luminous bodies. The patient also will usually have no proper specific distinction of objects left, but just a glare of the light itself.

There is one sort of Cataracts, however, that will never entirely fill the whole pupil, because they do not grow in breadth, but in thickness. This is the most dangerous species, and most likely to deceive the oculist that has not been very conversant in these matters, and who has not seen his patient frequently, in different situations and seasons, and in different positions of the light. It will in time grow inward, till it touches the chrySTALLINE humour, and makes one of those Cataracts which we call Glaucomatic: and when this happens, it is frequently of bad consequence, because of the extreme difficulty of couching such Cataracts without prejudicing the chrySTALLINE humour, to which it is generally adherent.

Mr. *Woolhouse* had seen several of these Cataracts continue fifteen or sixteen years, without eclipsing the sight entirely. The patient has even been able to read and write, enough of the pupil being left open for that purpose. Nay, he had known some with Cataracts of this sort see better than they did before, when they were purblind through the convexity of the chrySTALLINE humour, which this Cataract generally flattens,

tens, making thereby what we commonly call a longer sight. This is the same effect that is produced in old age upon other myopes, who see better, at least at a farther distance, than they could in their youth, because the chrySTALLINE humour is grown flatter.

Cataracts of this kind are generally of a yellowish hue, and a round form. The pupil retains its reciprocal spring, elasticity, or vicissitude of dilatation and contraction; as it necessarily must, generally speaking, in all curable Cataracts.

To try this, place the patient full against the light, shutting his well eye with one hand, and rubbing the affected with the other upon the eyelid shut. Then opening it suddenly, you will see the variations of the pupil as to dilatation and contraction; it growing narrower a great deal against a strong light, but broader in a light that is moderate, or when you turn the patient side-ways, to the point from which the light comes.

This is the most general diagnostick in all curable Cataracts, either to distinguish them from Glaucomas, or those that are simple from those that are complicated, which latter sort we shall describe hereafter.

However, as there is no rule without an exception, if the oculist perceives that the Cataract is woven directly with the very circle of the iris, insomuch that the matter of it distends



distends the pupil, and hinders its contraction, there is yet good hopes of succeeding in the operation of couching, this being a plain impediment to the diagnostick above-mentioned.

The antients presumed that Cataracts of this sort were Glaucomas, not only because of their colour, but by reason the pupil was immoveable, which is a common diagnostick of Glaucomas, when ripe for the operation. For there is an operation also for Glaucomas, and a certain maturity requisite in order to perform it. It is as ancient as that for the Cataract, and has been from the first confounded with it, not by the learned, but by the illiterate of all ages; *Hippocrates*, in his little treatise *de Visu*, distinguishing plainly the one from the other.

But this operation for the Glaucoma was never designed by the inventor to restore sight: it was only a palliative, to take away the deformity of the organ. This the ignorant not perceiving, the nice and specific distinction of these two distempers, as well as of the operations, was lost, and dwindled into nothing. And perhaps too we may attribute some of this confusion to covetousness and dishonesty, as well as to ignorance; and also to the subtle sophistical disputes of succeeding times, when men placed all the merit of genius in making fine discourses, very often upon things the most improbable,

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ble,

ble, contrary to the received opinions that had been founded upon experience, and without having themselves any acquaintance with the subjects they wrote upon.



## C H A P. VI.

*Diagnosticks of the Glaucoma: Further distinctions between that and the Cataract; with some extraordinary cases, and remarks on the use of Collyriums.*

**T**HE diagnosticks of a true Glaucoma are difficult enough, unless the oculist has seen it in the beginning of its growth: for then it appears much deeper, and in more distant perspective than a Cataract. The Cataract is always near the borders of the pupil; the Glaucoma is a tenth or eighth part of an inch, more or less, distant from it, beginning generally in the middle of the chrystalline humour: but as the Glaucoma increases, it spreads, blooms or opens, and renders the whole surface of the chrystalline humour opaque, sometimes of one colour, sometimes of another, as in  
Cata-



## Cataract and Glaucoma. 35

Cataracts; colour being in both an accident only.

It is indeed certain, that all chrySTALLINE humours, in dead bodies, are no sooner taken out of the sinus in the vitreous humour, but they become yellow; which probably was the reason why the *Greeks* gave the name of Glaucoma to the distemper we are treating of (particularly *Hippocrates*, who has been constantly followed in that respect by all who have wrote of the eyes to this day) and not because there are more Glaucoma's yellow, than of any other colour.

M. *Brisseau*, in his treatise concerning the Cataract and Glaucoma, pretends that the latter, according to the etymological signification of the word, must be of a greyish hue, or a deep blue; which the word *glau-cus* never signified either in *Hippocrates* or *Galen*, however it may have been used by other authors.

As the Glaucoma grows older and harder, it advances more and more towards the pupil, thrusting forwards in the watry humour, and quitting the cavity of the vitreous little by little: The *ciliar processes*, being no longer able to contain it, by reason of its hardness and dryness, and at the same time to retain their original alternative muscular opening and shutting, grow broader, flatter, or more convex, according to the different situation of the objects, farther from, or

nearer to, the eye, and the intention of the animal to perceive them distinctly.

When the chryſtalline humour is altogether dried, and become thoroughly opaque, it falls naturally out of its proper ſinus, into the very place where the Cataract is bred, and even touches the inward part of the iris, hindering its muſcular motion; juſt as a ripe acorn falls out of the cup, or cellule. Frequently it makes itſelf place, little by little, between the reduplication of the muſcle iris and the ciliar fibres; which latter give way, and grow ſhorter inwardly towards the vitreous humour, and longer towards the iris, or *vice verſa*: and all this according as the Glaucoma is thicker or thinner, heavier or lighter, and according as it happens to fall more on the one ſide or on the other.

Mr. *Woolhouſe* had ſeen an infinite number of Glaucoma's, that had fell thus by their own weight. He was once playing at bowls, at *St. Germainſ en Lay*, with an *Irish* officer, whoſe Glaucoma he had undertaken to depreſs, for the palliative cure only; when of a ſudden the gentleman felt a pain in his eye as he was bowling, and deſired Mr. *Woolhouſe* to look what was the matter. He found the Glaucoma altogether funk, and could diſcern only its edges, by looking down through the pupil.

Now the ſame kind of accident having frequently happened to ripe Cataracts, the parti-



## *Cataract and Glaucoma.* 37

partizans of the new opinion have from thence taken occasion to say, that were the true Cataract a membrane only, it could not so disappear on a sudden: yet that it does, Mr. *Woolhouse*, from his own experience, was certain.

He met with one case of a girl, at *Coutance* in *Lower Normandy*, who was born blind of both eyes, having a Cataract in each. No sooner had he planted his needle in one of her eyes, in order to depress the Cataract, but the girl vomited so violently [*d*] in his face, as made him obliged to desist from the operation at present. The mother, however, tormented him so, in the afternoon of the same day, to give sight at least to one of her daughter's eyes (he having performed several operations in the interim) that he complied. In a word, opening the other eye, the Cataract was perfectly depressed, and the girl saw well. He would give an infinite number of such examples and experiments, both of the Cataract and Glaucoma.

But the mechanical reason of this effect in both distempers is not the same. The

[*d*] We suppose the Cataract sunk at the same time, in order to continue the argument. Mr. *Woolhouse* used to observe, that this vomiting is a frequent case, as soon as the needle has pierced the membrane of the eye, especially if the patient has eaten any thing strong, or filled the stomach just before the operation.

Cataract adheres round to the inner part of the iris, by several fine threads, imperceptible by the naked eye: such as we perceive through a microscope, in the first threads of the woof of a spider's web, when just spun, and not yet dry. Now in rubbing the outside of the cataracted eye, we see the pupil open and shut, and the Cataract of course dilate or contract, according as the eye-ball is affected by the friction. Mr. *Woolhouse*, by this very action, had been able to distinguish the nature of a Cataract, and even to unhinge or loosen it in some part of its adherence. He had known other Cataracts fall in an instant; some by a fright; others by the patient's leaping into a river off some eminence to swim; others by a fall from a horse, and several like accidents.

Now it is easy to conceive what the different convulsions, irritations, and vellications, may, in the like cases, produce by various motions and effects upon the eighty-four distinct threads that constitute the muscle of the iris; as well as in the four muscles that compose the globe of the eye, the motory nerves in the ligaments that join the uvea to the sclerotica, &c. Which motions do the work, to all intents and purposes, that the oculist does by his needle in couching the Cataract; the membrane being as soon depressed



pressed by natural means of this kind, as the oculist can depress it with his needle.

To instance in one example for all. One Abbé *La Vacher*, at *Paris*, pretended to cure all distempers of the eyes by a blue water, made of vitriol. A woman having a Cataract, which Mr. *Woolhouse* was to couch, being afraid of the operation, went to him for some of his water to cure her Cataract. The Abbé confidently affirmed it would succeed, though he not only did not know the difference between a Cataract and Glaucoma, but could not distinguish a Cataract from an Albugo, an Ungula, or any other distemper of the eyes, nor had a general idea of the œconomy of this organ; having been always employed in foreign missions, especially to the *Indies*. The woman used his water several times a day, as he bid her, his rule being the oftener the better: she found the effects to be, a considerable inflammation of the eye, a pain in the head, and want of sleep, till she was ready to run mad at the consequence of her own rashness: all the surgeons and oculists having before told her, that there was no cure for her Cataract but the operation, of which, we before said, she was mightily afraid.

At last, however, she was brought again to Mr. *Woolhouse*, who, having applied several remedies to alleviate the pain, proceeded to open the indisposed eye, to see what

was

was the matter. He found a great chemosis, and two or three little shankers upon the white of the eye; but no Cataract appeared, and she distinguished objects perfectly well for one in her condition.

Such like accidents, produced by hazard, and by some mechanism of nature that we know not how to touch by rules of art, have, in all probability, given birth to the great number and diversity of collyriums and powders, most of them violent enough, and ordered even by the most learned authors, for the cure of Cataracts.

But the collyrium *ex felle*, or of galls, especially galls of fishes, that we find every where prescribed for the cure of Cataracts, has quite another origin. *Galen* himself, who orders it, and gives a long description of several other topical remedies to cure the Cataract, confesses that he never saw any good it produced. Now there is very little doubt but the rise of that remedy came from the history of old *Tobit*, whose eyes were covered over with a sort of Ungula, caused by swallows dung mired in them, as he lay sleeping under his roof; wherein were swallows nests: the good old man having that fixation of his eyelids, which we call *Lagophthalmos*, or hare-eyed, and sleeping with his eyes open. We are told the angel *Raphael* was sent from heaven, to teach young *Tobias* how to cure his father: and this revealed remedy of a  
fish's



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fish's gall, taken in the river *Tigris*, passed current by tradition even among the *Heathens*, and gave occasion to the mistake. The *Greek* word in the septuagint, for *Tobit's* distemper, is *Leucoma*; and the history tells us, that the son took like scales from his father's eyes; which description somewhat agrees with the nature of a Cataract: both word and description therefore contributed to propagate the error, which was delivered down traditionally to *Galen's* time, who reports it upon that authority, more than upon his own experience.

Mr. *Heister*, professor at *Helmstadt*, was the last learned man who blindly, and without considering the matter, prescribed that remedy for the cure of Cataracts: and Mr. *Woolhouse* used to say, that he did not doubt but the acrimony of it might again mechanically, at one time or other, produce the same effect, as well as the *Abbé La Vacher's* blue vitriol water did in the story above related. But one in a thousand, he thought, were as many as ought to expect this benefit. And as this remedy is dangerous in itself, and the advantage of it so very precarious, the consequence is, that the operation is infinitely preferable; being both more safe, and much sooner ended; the whole being usually over in a very few moments.

*Galen*, in his *Therapeuticks*, acquaints us, that there are three ways of curing the Cataract and the Hypopyon; the first by discutient, or diaphoretic remedies; the second by transportation, or removal of the morbid matter of the distemper to a less principal place; and the third by the common operation.

We have already spoken of evacuating the subject matter of the Cataract, either in its beginning or increased state, by the operation called *parakentesis*. Now this is the same that *Galen* means, when he talks of curing the Hypopyon by letting out the matter, as he explains himself afterwards by the terms of evacuation of the Hypopyon. But the other operation, by way of transportation from one part of the eye to another, he explicates afterwards. As to the *kenosis*, or evacuation of the humour in the Cataract, he is very express; comparing the couching of a Cataract to the operation performed in the dropsy. He says, he saw several Cataracts couched, and is very distinct in his accounts of the different operations.

But *Pliny*, in his natural history, seems to have fallen under a mistake on this subject, and *Albucrasis* to have copied from him. They confound the operations, or mistake one for the other; meaning the *parakentesis* when they speak of evacuating the gross part of the aqueous humour. *Pliny's*  
words



words are *educto humori*, and the *Arabian* speaks of a hollow needle, insinuating that it was an invention of his time to do that operation with a trochart, after the manner of tapping a dropfy: whereas this operation, as well as what we now call couching, was well and distinctly known to *Galen*.

But as the oculists of those antient times, as well as those of latter, endeavoured to make a mystery of their art, it is very probable that they who had the secret of using the needle kept it to themselves, and pretended they only let out the watry humour, on purpose to make others burst the eyes they took in hand; which is an accident that may by chance happen to the best operator. *Pliny*, who had himself no experience of this kind, might receive his information from these interested persons, and so be led into this error.

Or perhaps, after all, the mistake in *Pliny*, and his copier *Albucrasis*, might be owing to the transcribers of the former, who wrote *educto* for *deducto humori*, which is the proper *Latin* term for couching a *Cataract*, and used in that sense by *Celsus*, who lived within a century of the same time with *Pliny* and *Galen*.



## C H A P. VII.

*Of the patient's age in the operation  
for a Cataract.*

**A**LL our authors from *Hippocrates* downwards, *Greek, Latin, Arabian,* and the moderns to this very time, have universally agreed in this point; that the operation of couching the Cataract should not be performed to children. This mistake has been occasioned by a too literal adherence to some words of this first mentioned writer, in his small treatise *de Visu*: and fatal it has been to many persons, who in their tender years might have been cured; whereas they have been cruelly bred up in blindness and ignorance, because they found nobody hardy enough to attempt their relief.

Mr. *Woolhouse*, having observed many instances of this nature, thought it worth a *Christian's* while to make some essays on young subjects, to see whether the event would answer the hope he had of success. He performed the operation upon children of only eighteen months old, and brought them



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them perfectly to fight, contrary to the rule of *Hippocrates*, and his followers down to the present age.

The reasons these great men gave against the attempting of this operation, were as follows: First, that the Cataract could not be ripe enough in such tender subjects: Secondly, that these infants had not the understanding to keep themselves steady during the operation, according to the precepts of the oculist; nor after it, to govern and manage themselves so as to favour and promote the cure: Thirdly, that the Cataracts in young subjects were apt to rise again. This did not, however, deter Mr. *Woolhouse* from making the attempt, and with some difficulty he obtained his end.

In answer to the first reason of his predecessors, this gentleman said, that he always found the membranous Cataracts, with which children were born, even the youngest of eighteen months old, to be of more consistence, and fitter for the operation, than Cataracts generally speaking are at four years old.

As to the second difficulty, the child's not obeying the oculist in the operation, by turning the eye upwards or downwards, to the right or the left, according to direction; this concerns only the introduction of the needle: for the needle being in the eye, obliges it to move just as the oculist pleases.

Mr.

Mr. *Woolhouse's* method was, to have these young patients dress'd in swadling cloaths, and set in the lap of a strong man. If the child was very untoward, he let it cry till it was quite tired, and spent with struggling. Then having another strong man to hold its body behind, and a third to hold the head, he performed the operation. Sometimes he used a broad leathern girdle, with which he bound the child to the man in whose lap it sat; and this method he found to prevent many accidents.

The chief difficulty was, to watch the proper opportunity of planting his needle. When that was done, he found no more trouble here than with grown patients, who were often so indiscreet as to be very unruly, and would sometimes cause more trouble to him, and pain to themselves, than even children in the same circumstances.

After the operation was over, he used to give a dose of *diacodium*. By pursuing which method, he never had any bad accident follow in all the young subjects he undertook. At the time of his giving these lessons, he had to shew one of the youngest, whom he couched at eighteen months old, who had been living many years with perfect sight at *Paris*, being the son of an eminent merchant.

*Celsus*, in his seventh book *de Natura Oculorum, & eorum suffusione*, has grafted upon *Hippocrates*, and the other antients, an addition

in



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in these words : *Neque idonea curationi cæci anilis ætas est, at ne puerilis quidem, sed inter hæc media ætas* ; by which he would intimate, that the operation is not successfully attempted in old people, any more than in infants. But Mr. *Woolhouse* met with many instances to prove the falsity of this doctrine, some of which have been already given : and even other operators had before broke through this antient rule, which experience convinced them had no foundation.

It is indeed certain, that old men are more subject to Cataracts than the middle-aged ; and *Hippocrates* made a sort of aphorism from his own experience in this respect. Had not the operators couched Cataracts in old people, they would have had little to do in all ages.

The modern method has been, not to perform on any patient under seven years of age, nor above sixty : both equally errors, and very pernicious to mankind.

The third reason, that infants are apt to have their Cataracts rise again, has been found as false as either of the former : for a Cataract not superannuated, of a good kind, and well couched, seldom or never rises again ; nor can any motion of the head, or body, cause the cataracted eye to move, when both eyes are bound down with a proper bandage. So that in fact, all those frivolous precautions, generally prescribed after couch-

couching a Cataract, are more the effects of ignorance and quackery, than of true experience.

Patients of Mr. *Woolhouse* had gone home on foot after couching, or on horseback, or in a wheel-carriage; some had even fallen from their horses, others tumbled in walking, and others again had eat, drank, and conversed, as usual; and yet the Cataract had never risen: while others again, who had kept their beds with all the precaution imaginable, have yet had their Cataracts re-ascend, because they were of an elastic nature, and superannuated.

But in general, if one reflects on the inward structure and œconomy of the eye, and the straitness of the place wherein the Cataract is laid in the operation, it will appear almost impossible, if the operation be well finished, and the Cataract not elastic in itself, that it should break its prison, and emerge into the second region of the watry humour.

As for the case of old men, their Cataracts are generally so substantial and thick, and come to maturity in so short a time, that they are certainly more proper for the operation, than most of those in middle-aged subjects; which is quite contrary to the old doctrine, left us by *Celsus*. But here we must except people that are quite worn out and decrepid, whose eyes are much sunk,  
feel



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feel soft, and have the vitreous humour as it were dissolved, whereby the needle makes a great pit, or impression, before it can be made to pierce the tunics; likewise all blear-ey'd old people, whose eyes are clogged with a viscous matter, like that of fistulas; those that have ulcers in the cornea, or who are troubled with great pains in the head, and want of sleep; we may add those that are greatly afflicted with the stone, gravel, or gout; those that sneeze frequently; have already had a fit of the apoplexy, or are subject to a suffocating catarrh. This exception is not always so much because the operation would not succeed, as lest the consequences of these dangerous distempers should be imputed to the operation.

It is also proper to avoid meddling with children that are subject to epileptic fits, or that are troubled with a chin cough; or with any person, young or old, who has the distemper called *Hippos*: Mr. *Woolhouse* having remarked, in this latter case, that whoever had a Cataract with that distemper, had a *Gutta serena* complicated with it. But this is chiefly observable of those who had not the *Hippos* from their birth.

Many other abuses, that have crept into the practice of this operation, must be corrected by the judgment of the operator, according to the patient's constitution, the

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season

season of the year when the operation is performed, and other circumstances that are liable to vary.



## C H A P. VIII.

*Of the patient's regimen, and the season of the year for performing the operation.*

**I**T is a general rule, after the operation, to diet the person with nothing but broths, jellies, new laid eggs, pap, possets, cordials, and the like. By this means not one patient of a hundred but is made to vomit the first day, the fibres of his stomach being relaxed by the use of such thin meats. It is better therefore to give him somewhat more substantial, that is not inflammatory; and the stomach will be found better to retain it. Mr. *Woolhouse* was so little observant of the strict and low regimen, that he has made a country farmer dine with him, after the operation, upon boiled pork and pease, and yet every thing succeeded perfectly well.

Another vulgar error in this treatment, is keeping out all manner of air, having the windows



windows and doors shut, and the bed-curtains close drawn; so constraining the patient to keep his bed, though in ever so hot weather. This method, instead of doing good, has in many cases been found to produce very bad accidents; partly through the constraint, and partly through the lying continually upon the back. It was Mr. *Woolhouse's* care therefore, not to put his patients to bed till bed-time, and to make them rise at their customary hours in the morning. He thus prevented their dosing in the day time, and keeping awake in the night, which generally happens to those that are otherwise treated.

He was also an enemy to the general custom, that prevailed all over *Europe*, of preparing the patient for this operation by bleeding and purging. Bleeding before-hand has seldom any manner of effect to prevent an inflammation: but bleeding after has infallible good consequences, in case of inflammations or fluxions. As for purging, it is still more pernicious than bleeding, unless done ten or twelve days before the operation. *Celsus's* preparatory rule is the only one generally requisite, and indeed that is most excellent: it is, to use a strict and rigid diet for some time before, whereas the common operators prescribe this after they have done their work.

This better answers the end designed by bleeding, purging, or blistering: for blistering should be no more used than either of the former, unless the disposition of the patient indicates the necessity of it, as in a plethora, pains of the head, or the like. And even in these cases, a rigid diet, with gentle bleeding, and vesicatories only, are to be preferred to more violent evacuations: for purging causes great havock in such full bodies. When there are pains or dizziness in the head, frontals should be applyed, and other proper alleviating medicines; and such disorders generally attend this operation, which, without great care, may be the occasion of very bad consequences.

Glysters are here also very useful. They are infinitely to be preferred to purgatives, as cleansing the body from all fœculent matter, and preventing those natural dejections which are apt to follow the operation, and are sometimes of ill effect. In case of costiveness they are more peculiarly necessary, the straining occasioned by purging being very hurtful to the eyes; much worse than talking, moving the head, or chewing, actions which all authors have been so careful to forbid.

The operation we are speaking of can be performed at any season of the year, if the patient offers himself with a ripe Cataract. This is a particular in which the world has been greatly abused by common operators,  
who



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who pretend that the spring and fall are the only times in which their business ought to be performed. But the truth is, that they make these seasons their harvest of strolling, which they cannot so conveniently do in the extreme colds of winter, or heats of summer. This doctrine, however, is very injurious to patients, not only because the spring and fall are usually the most busy seasons, but because they are really less adapted to this operation than the times nearer the solstices. What they may be for lithotomy is another question, which it is not our business to consider: but as prejudice goes for the affirmative, and the same operators do both, they are willing, according to the proverb, to kill two birds with one stone, and so confine the operation for the Cataract to the times of that for the stone [e].

Whereas in fact, the effervescence and ebullition of the blood being renew'd about the vernal equinox in particular, as well in old as in young people, the operation is thereby subjected to many accidents, which in the cold season, when the humours are sluggish, thickened, and as it were dormant, it is not liable to. And in the autumnal season, people are generally exhausted by the long heats; and the rains then coming on, with great varieties of warmth and

[e] It should be remembered in this and many other places, that these dictates were given in *France*.

cold, the patient is more likely to receive ill impressions from the weather.

Besides, as it is usual to make patients lie in bed several days after the operation, the spring and fall are the most improper seasons for that constraint, as hath been remarked in a great number of instances.

It was proper to say thus much, in order to oppose the vulgar practice of itinerant operators, who have many more cases of this nature, in the country, fall into their hands than regular practitioners. What they do and teach is for their own conveniency : but persons who are so unhappy as to have afflictions of this kind ought to be convinced, that a Cataract may be couched with more presumption of success in the midst of winter, than in the times prescribed by these mountebanks.



## C H A P. IX.

*Different kinds of operations for the Cataract. And of fixing the needle wrong in the operation.*

**T**HE common operation for the Cataract and Glaucoma are much the same, the ripe Glaucoma being advanced into the very place of the membranous Cataract :



## *Cataract and Glaucoma.* 55

taract: but there are several other operations for this latter, which vary according to circumstances.

The first is called *Kenembatesis* (Κενεμβάσεις) *vacui introitus*, entrance or ingress into the vacuum of the eye. This is what we properly call in *England*, couching, laying, lodging, hiding, or depressing the Cataract.

The second is the fenestration, terebration, or perforation of the Cataract adhering to the iris. These terms are common both to the *French* and *Italians*: but in *English* we say sometimes to drill, or bore a hole in the Cataract.

By the third operation we separate the Cataract from the inward fringe of the iris, where it sometimes closely adheres, and gives the unexperienced oculist great pains to disengage it. This is called, to discover the eye-ball or sight, to dissever or uneclipse the Cataract.

The fourth belongs to the interwoven or webby Cataract. It is called cleaning, riding, or delivering the pupil, or apple of the eye.

The fifth is the inversion, subversion, or turning of the Cataract upside down. This belongs to the parchment kind of Cataract, which will bear to be rolled up.

In the sixth operation, which is called the comminution, dissipation, or dispersion  
of

of the Cataract, the extraneous body is cut or sliced into a great many pieces, and by that means removed.

The seventh operation is appropriated to the Glaucoma only: it is the collocation, ocultation, immersion, deposition, or degradation of the Glaucoma. We sometimes call it curing the wall-eye, or false Cataract.

Pricking or opening the chylous Glaucoma is the eighth operation.

The ninth is the suspension or hanging up of the Cataract.

Extraction of the Cataract or Glaucoma is the tenth. This is done by passing the offending body through the pupil, and inclosing it between the cornea and the iris. We sometimes call it releasing or discharging the Cataract.

The eleventh operation is that of repressing the Cataract, or forcing it back into the posterior or chamber of the aqueous humour.

But we return to the common operation, which is practised ten times where either of these comes in once; they being necessary only in some sorts of heteroclite or superannuated Cataracts, that may fall in the way of great and long practice.

It has been a great subject of dispute, how far distant from the circle of the horny coat, the needle is to be placed in this operation. Messieurs *Brisseau*, *Heister*, and

*St. Jecq.*



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*St. Ives*, who make no distinction between Cataracts and Glaucomas, direct to place the needle four lines distant from the external circle of the cornea, immediately in the vitreous humour, and through all the tunics of the eye, not sparing even the retina itself. By thus turning it obliquely to the chrySTALLINE humour, they some how or other used to fumble down the Cataract, paying no manner of regard to the inward œconomy of the eye.

It is inconceivable how so absurd a system should gain credit with the learned: but some blind examples of Glaucomas, being taken for Cataracts, imposed for a while upon the physicians and surgeons; and the quackery and ignorance of mountebanks, prevailed against all imaginable proof and demonstration.

*Maitre-Jean*, who owns Glaucomas to be in the chrySTALLINE humour, works with more precaution; yet says the needle must pass in the glassy humour to couch his sort of Cataract, which is complicated with a Glaucoma. The *English* author before-mentioned, in his ophthalmographia, follows the above gentlemen exactly; only in one particular he goes a little farther. He says, the needle is to be planted a shilling's breadth from the outward circle of the cornea: at which rate, a bull's eye would hardly be large enough to afford room for the operation.

tion. But if any of these gentlemen ever gave sight by their unaccountable way of operating, it is to be the more attributed to chance, or to those miracles that frequently happen in surgery, than to any rule that can be rationally accounted for by an anatomist or optician: it being impossible that such havock, such slicing and wounding every part of the eye, should any way contribute to vision.



## C H A P. X.

*Of the chrystalline humour, its use  
in vision, &c.*

**T**HE new system, that a Cataract is nothing but the opacity of the chrystalline humour, occasioned the reasoning above-mentioned: they finding several chrystalline humours that would not yield to the needle, as *M. Antoine* himself owns. He differs indeed from others in this, that he confesses all Glaucomas, whether curable or incurable, to be in the chrystalline humour; whereas they, on the contrary, place all Cataracts in that humour. But finding some of their pretended Cataracts hard to couch,  
and



and misunderstanding the antient authors who had writ upon this operation, their only expedient, to obtain the desired success, was so to plant the needle, that they should at least dethrone the chrystalline, whatever came of it.

It is now about a hundred years ago, that *Plimpius*, in his ophthalmographia, asserted first that the chrystalline humour was not absolutely necessary to sight. He was followed by *Gassendus* in his physicks, *Robault* in his philosophy, and the Abbé *Marriot* of *Paris*. But these gentlemen carried the thing too far, upon an illusory optical experiment, that baffled their reasoning. They found in effect, that all people who had Cataracts couched, young and old indifferently, were unable to read or write afterwards without convex spectacles: wherefore, said they, 'tis the chrystalline humour that is deposed in the operation on a Cataract, and no membranous body; and the defect of the chrystalline is repaired by these convex spectacles, which we see always used with success after this operation.

Mr. *Woolhouse* was the first, and indeed the only writer, who made it appear, in several treatises, and essays in the literary journals, that it was not on account of the want of the chrystalline, that those who had their eyes couched were obliged to wear convex spectacles, but because this operation

unavoidably made the eye more flat; and that if the chryſtalline was dethroned, convex ſpectacles would be of no real uſe, according to their own hypotheſis, which makes the vitreous humour to fill the cavity or ſinus left by the chryſtalline, and to conſtitute, as it were, a new chryſtalline. This is verbatim the doctrine of *Gaſſendus*, and indeed we may call it his invention, which has been made uſe of by all his followers; eſpecially *Antoine, Briſſeau*, and *Heiſter*; who yet do not name him, but all three equally pretend to the diſcovery. By this means they impoſed upon the Abbé *Bignon*, the academie royale, the faculty of phyſic at *Paris*, and that of ſurgery at *St. Coſme*, till *Mr. Woolhouſe* reſtored the honour to the right owner.

This gentleman demonſtrated that their optical experience, which our three authors boaſted as unanſwerable, on account of their mathematical demonſtrations, muſt fall to the ground upon their own principles; they all holding with *Gaſſendus*, that the vitreous humour fills up the ſinus which the chryſtalline poſſeſſed before their pretended operation: and if ſo, what need of a convex ſpectacle to ſupply any defect? eſpecially ſince we find by millions of experiments, that ſuch ſpectacles are altogether uſeleſs after the operation of the real Glaucoma, where 'tis allowed that in depressing the  
chry-



chryſtalline, the vitreous advances and fills up the ſinus, though without any manner of convexity, that being reſſed in the very inſtant of the operation by the watry humour itſelf: for this being driven from the lower part of the eye, where the chryſtalline is placed, comes with more force, and in greater abundance, upon that particular part of the vitreous humour now ſuppoſed to be in the place of the natural chryſtalline.

He and his pupils ſeveral times performed the operation of the Glaucoma at *Paris*, with all imaginable ſucceſs, except the perfect reſtoration of ſight, which is not to be obtained but in caſe of the true Cataract, as contradifſinct from an opaque chryſtalline humour. We do not regard this being contrary to the opinion of *Plimpius* and *Gaſſendus*, who followed the error of certain *Greek* empericks; ſince it is certain, that though the animal ſees after the methodical depression of the Glaucoma, yet it ſees but very imperfectly, and not at any competent diſtance, with ſpecific diſtinction of the objects. For example:

All thoſe in whoſe eyes the Glaucoma has been depreſſed with ſucceſs, diſtinguiſh night from day, the fire, a candle, and all white objects: they can, generally ſpeaking, tell you whether it is a man or a woman that ſtands before them; but they all own, that they judge only by their white head-clothes.

They

They likewise distinguish black from red; but no other colour: nor can they name a particular object they see, unless it be moved just before their eyes. When they use Cataract spectacles, they see nothing but a confused sea of light: whereas those, in whose eyes true Cataracts have been couched, First, distinguish all manner of objects at some competent distance, without any use of Cataract spectacles; Secondly, see to read and write perfectly well, with the use of the said spectacles.

Now the reason of this difference in the eyes of the one and the other is manifest. In couching the true Cataract, we depress only a foreign adventitious body in the bottom of the eye, which cannot possibly be done without a rupture of two or more of the ciliar fibres on each side, where the needle enters: and by suppressing this extraneous body between the reduplication of the iris and the ciliar processes, we embarrass the muscular motion of the iris, and hinder the spring of the inward œconomy of the eye. Thus the inward structure of the eye becomes more flat than naturally, nor can it exert its alternative convexity and depressure, as it did before, to discern objects in their different positions and distances: and hence the eye, remaining inwardly always flatter than it was before the operation, has an indispensable and manifest need of those  
those



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those convex glasses, called Cataract spectacles; and not because the chrystalline has been dethroned, as the gentlemen we argue against pretend.

This is farther evident from the daily experience we have of most old people, who are obliged to make use of thick spectacles, more or less convex, according as the convexity of their eyes is more or less diminished, and as the chrystalline humour is flattened and decayed by age. Some old subjects indeed there are, in whom the pupil has lost its spring, or vicissitude of dilatation and contraction, through the induration of the chrystalline humour, and the rigidness and toughness of the iris: to these spectacles less thick, and almost flat, are of specific use. All which contradicts the erroneous opinion, which supposes the want of the chrystalline to be supplied by the vitreous, and the natural convexity of the eye not diminished: for if this were the case, convex and thick spectacles could be of no use at all, which is contrary to all experience.

Again: This pretended new hypothesis is contrary to all anatomical demonstrations: for the chrystalline humour is but little convex in man, except in those we call myopes, or mope-eyed, to whom concave spectacles are only useful. But the authors of this doctrine, in all appearance, formed their judgment

ment either by some such mope-eyed human chrystalline, or else by the chrystalline of some beast's eye, as a dog, a sheep, an ox, &c. who have all very convex and hard chrystalline humours: and such animals see not at the same distance as men do in common, their natural food being always near upon the ground, and their scent supplying the want of sight on other occasions; whereas the sight of man is made to answer other noble purposes, according to that of the poet;

*Os homini sublime dedit, cælumque tueri  
Jussit, et erectos ad sidera tollere vultus.*

Mr. *Woolhouse* used to produce another invincible arguments against this antiquated and revived hypothesis; which is, that all persons who are born mope-eyed or purblind, if ever they come to have Cataracts, and get them happily couched, see ten times as far as ever they did before, without the use of any spectacles at all. Is not this an undeniable proof, that their eye being made flatter than it naturally was, they see much after the same manner that other people do, whose eyes are neither too flat, nor too convex [f]?

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[f] One instance he gave of this was in *Madam Prud'home*, who was living at *St. Germain's* when these dictates were taken. This lady was from her birth al-

ways



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There is one advantage in eyes of this sort, when they have the misfortune to be cataracted. They afford more room than common eyes to place the Cataract in when depressed, without hindering the natural elasticity, and the muscular vicissitude of the iris's dilatation and contraction, which we have so often mentioned.

It may be truly said, that gentlemen who think in the manner we have endeavoured to explode, cannot know how to dislodge a Glaucoma according to art. They have too frequently learned their practice, if not at first, yet at second hand from mountebanks, and ignorant empiricks, who make a craft and mystery of the dexterity they have acquired in the use of the needle. When such persons as these pretend to give instructions, they think it their interest to teach rather to burst eyes, as before observed, than to cure them.

We have seen already that the mathematical demonstrations of our modern reasoners have failed them, and that they have been equally deceived by their anatomical experiments. It is easy to shew farther how they have been deluded in their opening of eyes,

ways purblind, and touched the book with her nose when she read: but after being couched by Mr. *Woolhouse*, which was then thirteen years ago, she came to read and write at due distance, without spectacles, and could know any person or thing a great way off, in the same manner as has been observed of aged people.

M. *Brisseau* found several Glaucomas in cadavers, and, by the false hypothesis he had embraced, judged them to be Cataracts. The consequence was, that he sought a ready way of couching these Cataracts; which he was forced to own he could not do, without planting the needle in the vitreous humour. ‘Generally speaking, says he, the deposed chrystalline must be thrust into the very body of the vitreous humour, where the working is performed: though sometimes, he adds, it gets farther behind, and covers the optic nerve, so that the sight is utterly destroyed.’

M. *Antoine* places the chrystalline between the uvea and the vitreous humour, which is absurd. But if he had said between the uvea and the retina, this objection, would have lain against him, that the hardness of the glaucomatic chrystalline, between the uvea and retina, must necessarily, in a little time, quite spoil both the tunics, and, with intolerable pain, likewise destroy the fine contexture of the cells and nervous vesicles, that contain the clear liquor which constitutes the vitreous humour: yet that it was between the uvea and the retina he ought to have said, and not between the uvea and the vitreous humour (as he prudently places it to conceal his want of skill) is pretty manifest.

The



The decomposition or solution of this vitreous humour (which is known by its softness when the eye is touched) must be attended with irreparable loss of sight. So that *Antoine's* manner of operating is equally dangerous with those of *Brisseau* and *Heister*, who had been all equally imposed upon the quacks of different countries.



C H A P. XI.

*Description of the common operation. Different chambers of the eye.*

**T**HIS leads us naturally to the most artificial place of planting the needle for this operation, as we have had it traditionally communicated for one hundred and fifty years past, and according to the authority of *Mr. Woolhouse*, who had made such an infinite number of experiments, or seen them made, under his direction, by his pupils.

The needle then must be planted at two lines distance, at the most, from the outward circle of the cornea: it must be held straight, and pushed on direct, all at once, and without fear, till we find by the crack

or noise it makes that it has passed all the tunicks; which are, the conjunctiva, the sclerotica, and that part of the uvea that surrounds the muscle iris.

As soon, then, as we find the needle in the hollow, (called by *vacuum* or *inane Celsus*, who interprets the *Greeks*, his predecessors, perfectly well,) we must by little and little recline our hand and our needle backwards, towards the ear, resting the hand upon the face of the patient, and thrusting gradually the needle forwards in a right line between the iris and the chrySTALLINE humour; observing always to hold the flat of the thumb upon the pupil, with the eye-lid shut down upon it, as well to flatten, as much as we can, the chrySTALLINE and vitreous humours, as to repel the watry humour from the first region of the eye to the second, where the needle works. By thus filling the second region we make it more spacious, and less dangerous, consequently, to operate in. We open the eye-lid now and then, to see how far the needle is entered: for we never begin to work till it has passed at least two thirds of the diameter of the pupil, leaving but just distance enough to see the point of the needle, which must never be hid from the operator.

When the needle has traversed so far in the second region of the eye, the operator begins to work with the flat part of it upon  
the



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the edge or rim of the Cataract; laying it full upon, at least two thirds of the Cataract's diameter, and never working with the point of the needle in its depression, after he has therewith found room enough to play the flat or depressing part. The Cataract must be depressed with an equal poise, weighing judiciously upon the body of it, which otherwise would break or tear into several pieces, and ruin the credit and effect of a perfect operation; by which a good oculist means, laying the Cataract all in one entire substance, like a scale, and making the pupil as black and clear as the eye-ball naturally is.

The needle must be lowered gradually according as the Cataract descends: in order to which, the operator's hand must gradually rise, till the extraneous body is entirely hid in the bottom of the eye, on the other side of the iris. When we can see it no more, and the pupil begins to contract itself through the influence of the light, it is proper to shut the eye for a while, as well to give repose to the operator, as to the patient; and then opening it again, lift up the needle gently towards the eye-brow, in order to see whether the Cataract be well couched, or depressed: for if it remounts, and follows the needle, we must go to work again, and again if it re-ascends a second time, and so on till it remains fixed, and as it were fet-  
tered

tered and imprisoned between the iris and the ciliar processes, under which it distends beyond their natural tension and tone, and bears upon them and the uvea, driving the aqueous humour from that part of the bottom of the eye, whereby all the inward structure of the eye loses its natural oscillation or elasticity.

The operation being thus compleated, we pull forth our needle in a straight line, but first applying the compresses, to hinder the issue of the watry humours through the puncture, which will infallibly happen, more or less, without great precaution.

Mr. *Woolhouse's* adversaries were in an unaccountable mistake, which occasioned their obstinately continuing to oppose the plainest reasonings, and led him into a fifteen years dispute concerning the manner of fixing the needle in this operation. He had on his side universal tradition, till the new philosophy introduced the error we have so often disputed against? Some were at last convinced by him, upon this single proof, that planting the needle where he prescribed never hurts the chrystalline humour, the point being found precisely in the second region of the eye, between the iris and the chrystalline, according to the doctrine of *Galen*, in his treatise *de usu partium*. This ancient gives a graphical account of both the distempers that are the subject of this essay, which the  
moderns



moderns have so carefully confounded; pretending also, that it is impossible so to place the needle, that it does not pass the vitreous humour, and ravage the chrySTALLINE.

But as most of their experiments were made upon the eyes of beasts, or human cadavers, the distance of the iris in these subjects from the chrySTALLINE, is not above half a line; the little vessels that compose the iris subsiding at the very instant of death, and all the volatile sulphurs and salts that animate that part being dissipated. Hence the old proverb, used by nurses and country-women, who say commonly, 'the eye-strings are broke,' when they perceive at the instant of death a cloud cover the sight, the iris subsiding upon the chrySTALLINE humour, and the eighty odd nervous strings, that compose this muscle, being no longer distended by the animal liquid, which the ancients talk so much of, and which *Celsus* places in the apple of the eye, calling it *spiritus ætherius*. So that it is in the case of death only, that the second region of the eye is lesser by much than the former, contrary to what Mr. *Woolhouse's* antagonists maintained.

They even went so far as to say, that it was impossible any such membranous body should be formed in that little space, without adhering to the chrySTALLINE humour, and becoming one and the same body with it.

it. Mr. *Heister*, though he sometimes allowed of membranous Cataracts, oppugned Mr. *Woolhouse* on this subject in three *Latin* treatises, pretending, it was physically impossible to couch such a membranous Cataract according to the antient system, without depositing the chrystalline. Mr. *Woolhouse* always maintained the contrary, as well he might from his own experience. At last he was able to produce six Cataracts in human eyes, wherein the chrystalline humour remained transparent, and in its natural situation. This was such demonstration as Mr. *Heister* could not resist: he therefore tacitly gave up the subject in his course of surgery, but not without continuing to dispute upon the different largeness of the two chambers of the eye. However, as all this gentleman's experiments, as well as those of many others, were made upon dead bodies; Mr. *Woolhouse* had good reason to persist in his argument, and invalidate such experiments. He did so in fact, demonstrating that the former region of the eye is nothing near so large and so deep as the latter. His proofs were as follow :

*First*, the eye increases, as it advances from the fore-part of the cornea, in bulk and diameter: for the cornea being at the extremity of a convexity, and ending as it were in a cone, the first chamber is naturally conformed to this configuration, which  
must



must make it narrower and straighter than the second; and the iris joining it at the edges, making this first region of the eye; it cannot but be more contracted than what follows it behind, which grows gradually larger till it comes to the glassy humour, which is depressed, generally speaking, all round: so that the second region of the aqueous humour contains at least two lines and an half in diameter more than the former.

Moreover, the muscle of the iris floats between two volumes or partitions of the aqueous humour, and in its spring, or vicissitude of opening and shutting, is always pushed forwards toward the cornea, and repels, by this mechanism, the anterior volume of the aqueous humour backwards: so that, generally speaking, there is not above half a line's breadth of this humour in the anterior chamber.

This is confirmed, *First*, by the operation of the hypopyon; where the pus, though never so little, corrodes the cornea on the one side, and the iris on the other.

*Secondly*, By the operation of the synechia, where the little ulcer, no bigger than a pin's point, joins both the iris and the cornea together.

*Thirdly*, The cornea and the iris stick close together at their extremities, at least for a line's breadth. And,

L

*Fourthly*,

*Fourthly*, Cataracts that float well in the second volume of the aqueous humour, when they pass through the pupil, as they frequently do in the operation of that distemper, fill entirely the first partition, totally eclipse the sight, are united, as it were, to the cornea and the iris, and become altogether immoveable: these are very painful to the patient, cause great inflammation, and at last utterly destroy the iris.

Another proof of the different magnitude and distance of the two chambers of the aqueous humour, is in the operation of the empyema, which is the evacuation of matter suppurated from the uvea into the second chamber: now this suppurated matter exceeds in quantity four or five times, at least, the suppurated matter from the hypopyon, where it issues from between the cornea and the iris.

Mr. *Heister*, and his adherents, being unwilling yet to be convinced, at last own'd [g,] that one cannot well make a demonstration of the different distance of the said regions for the reasons assigned; but alledged, that he had found out another experiment, to prevent the effusion of the watry humour from both chambers equally at the same time. This invention was to congeal or freeze some eyes, whereby he thought in the same gradation to fix this humour in its two receptacles.

[g] In the *Ephemerides Naturæ curiosorum Germaniæ*.



He insisted, and Mr. *Woolhouse* owned it very probable, that he found four times more humour in the anterior than in the posterior chamber. Much the same experiments were made at *Paris*, by Messieurs *Winslow* and *Petit*, and to much the same effect.

For Mr. *Woolhouse* soon demonstrated, that these, like their many former experiments, did not at all come up to the purpose. He argued thus :

In all frozen eyes, if the ice begins in the former district of the aqueous humour, it must necessarily depress the iris, already subsiding and shrivelled by death, and touching the chrySTALLINE humour; without leaving any numerical distinction and interval of two volumes or chambers, wherein the humour ebbs and flows alternately on each side of the iris: but if the frost seizes first the chrySTALLINE humour, as has been generally found by experience, then it must of necessity, by that extension and dilatation usual in all frozen liquors, push forwards all the aqueous humour into the first district of the eye: so that this experiment is altogether fruitless, and of no real validity.

Indeed the difficulty here cannot be otherwise resolved than by *Galen's* rule in reference to this dispute [ *b*, ] who says, that

[ *b*. ] *Anatomia Vivorum*, mentioned in his treatise *de usu partium*.

by the play of the needle in an animated eye, wherein a Cataract is couching, the needle being moved all manner of ways, without hurting the chryſtalline on one ſide, or the iris on the other, affords a demonſtration of the great ſpace in that chamber of the eye. Both the late Mr. *Woolhouſe* and his father, to prove the truth of this, had ſeveral times introduced a needle into ſound eyes, and tryed the different motions neceſſary in the operation of the Cataract; and they found, that with proper management the chryſtalline humour was not in the leaſt hurt in ſuch trials: whereas in the operation called ſynechia, 'tis impoſſible to avoid touching the iris on one ſide, and the chryſtalline on the other, unleſs the needle be introduced above a line's diſtance from the outward circle of the cornea; which holds good as well in the operation for the Hypopyon, as in that for the Cataract.

This being the true ſtate of the diſpute, any experiment except upon living ſubjects is frivolous, and the conſequences drawn from it inconcluſive: but in trials upon animated eyes, the antient and true doctrine has the greateſt evidence.





C H A P. XII.

*Farther examination of the true method of operating, compared with that lately introduced upon false principles. Form of the needle, &c.*

OUR modern operators have been very much mistaken in the meaning of *Celsus*, whom they profess scrupulously to follow. The words of this antient are; *Acus medio loco inter nigrum oculi et angulum temporis propriorem, è regione medicæ suffusionis demittenda est.* By which Mr. *Heister* and the rest of his party understood, that the needle must be placed in the middle, between the outward circle of the iris and the lesser angle of the eye, when the eye is turned towards the nose: without foundation supposing, that the oculists, in the time of *Celsus*, used to make the patients turn their eyes in this manner, which is purely a modern invention and practice: for the antients only bound down the sound eye, keeping that they were to operate on in an equilibrium, and then planted the needle straight

straight forwards, in the middle of the conjunctive, between the outward circle of the cornea, and the lesser angle of the eye.

Now in this position of the eye, there never apparently remains at most above two lines distance of the conjunctive: so that good judges, to this day, observe the very same point of distance found out by the antients, and traditionally delivered down. Even such as never heard what the antients did, have discovered this by practice to be the only infallible rule, in which the mystery of their art chiefly depends. No author indeed, in any language, mentions it, or seems to have known any thing of the matter, they writing rather from what they had heard of others, than their own experience; and we have before several times observed, that the operators in this case, who were usually itinerants, always made a great secret of this their main piece of art.

But if any followers of the new system succeed in their operation, it must be the effect of hazard only, and not in consequence of their pretended rule, which is contradictory to all experience, anatomical, physical, and mathematical; so far from being, what they call it, demonstrative. On the contrary, whosoever observes the rule here laid down, let him be ever so ignorant of the anatomy of the eye, if he has but a steady hand he  
will



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will certainly succeed, or at least he will do no hurt, if he happens not to do any good.

Mr. *Woolhouse* had another infallible rule, which he learned from his ancestors, and which he taught as perfectly conformable to the preceding: it was the placing of the patient, as already mentioned, towards the window, with the sound eye bound down.

As to what farther concerns the operation, it is necessary to observe very nicely the breadth of the iris. This may be done by opening the well eye suddenly, and turning the cataracted eye on the shady side. Now this breadth of this muscle being thus found, we are to observe, that the one half of it is the point to be perforated in the operation of the Cataract, be the eye never so big, or never so little. In some large eyes the distance of two lines is not enough; whereas in other small, flat, or as we vulgarly call them, pig's eyes, it will be found too much.

The reason of our second rule is this: The ciliar processes and reduplication of the iris do not permit the muscle of the iris to be farther extended outwardly, than the proportion to be pricked in this operation: whoever, therefore, plants his needle in the said point, passes between the ciliar ligament and its processes, which are not above two lines and a half long in the biggest human eye, and which are longer inwardly, according to the striction of the  
muscle

muscle iris outwardly : and *è contra*, when the pupil is almost closed, being placed full against the light, and the muscle of the iris is very large outwardly, then the ciliary processes are very short. This is the reason why mountebanks and strollers, who do this operation in the open air and light, always damage the eye, and generally passing the needle through the glassy humour, wound the chrySTALLINE ; which gave occasion to the vulgar error, that it is impossible to couch a Cataract without hurting these humours; and to the modern system, that Glaucomas are the only Cataracts.

Whoever he was that contrived the patient's squinting in this operation had good reason : for by that practice the eye is kept much more steady and free from rolling, while it reclines upon the bones of the orbit next the nose. And in all probability, before this practice was introduced, the frequent ill accidents that attended the way of operating in the tonic motion ought to be attributed. These accidents still frequently happen, upon the least motion of the eye on the temple side, when the oculist is going to work : such, for instance, as the turning back the needle, and hindering it from piercing at once all the tunicks ; when it only enters into the body of the sclerotica obliquely, and running along the fibres of it, prevents the operator from coming to the vacuum in the pupil,



pupil, causes intolerable pain to the patient, and frequently the entire destruction of the eye by ulcers and abscesses, that generally follow this oblique way of introducing the needle. It is commonly attended likewise with great pains of the head, pulsations of the arteries, Hypopyon, and Hypos itself: so that for three or four months there is no giving any relief.

Moreover, when the eye is not kept steady against the bones, the very fear has made the patient turn his pupil towards the operator's needle; just as he has been going to plant it; and as the puncture must be made instantaneously, the oculist having taken his aim, for example, at two lines distance from the circle of the cornea, by the patient's looking towards him, the needle has been planted in the very middle of the pupil.

There is another mechanical reason for this practice. The eye being a globe full of fluids, when it is pressed hard towards the bones of the orbit on the side of the nose, it is flattened on that side, and the watry humour that naturally resided there is repelled to the other side: so that in such a position the region of the watry humour gains at least a line's depth more than ordinary, on the temple side, which has always been the constant place for making the puncture; where-

by the needle has much more liberty and space to work in, than it would otherwise have.

Mr. *Heister*, and those who follow him, have been greatly mistaken in *Celsus's* sense, when they direct, as from him, the planting of the needle in the middle of what appears of the white of the eye, when it squints towards the nose: for at this rate the puncture must be made near the root of the optic nerve, and so the retina, and all the other essential parts of vision will be wounded. Mr. *Woolhouse* observed, that gentlemen did but discover their ignorance in pretending to teach what they did not understand, and what they never could learn without a good master; these rules not having in his time been in any printed book, and being known only to experienced practitioners.

Mr. *Heister* committed many other learned blunders, in writing upon this subject: as for example, when he orders a *speculum oculi* to be used in this operation; a thing that never was practised, and is not only impossible in itself, but, if possible, would be absolutely useless: for the eye is no sooner entered by the needle, but the oculist turns it as he pleases upwards or downwards, backwards or forwards, as occasion requires. Whereas if the eye was fixed by the *speculum*, it could by no means turn itself according to the present emergency, nor could the oculist work freely under this incumbrance.

But



But the rise of this mistake is easily perceived, by those who have read in some authors of the operation of the Ungula, sometimes called *Cataracta externa*, in which the *speculum* must always be used.

Our *German* professor also orders the operator to moisten his needle with spittle; which is so far from helping its introduction, that it is a great impediment to the quick passage through the tunicks, which should be made in an instant; otherwise the operator loses his aim, and misses for that time the operation, the patient being so discouraged by such a miscarriage, and the painful pressure that has been made on his eye, that he rarely submits directly after to a fresh trial. The slow introduction of the needle also frequently disorders the inward œconomy of the orb, especially if it be a round needle, which sort do not pierce so easily as the lancet form, which should therefore be preferred.

Much experience in this operation has taught, that there is more elegance and subtilty of expression, than validity of reason and result of practice, in *Celsus's* rule of the medium. That antient refines and quibbles much upon the word middle. 'The pupil; says he, is in the middle of the iris; ' the eye must be held stedfast in the middle ' of the orbit; the needle must be passed ' through the middle space of the white;

‘ between the outward circle of the cornea  
 ‘ and the lesser angle ; so that it be received  
 ‘ just in the middle of the pupil ;’ with  
 more to the same purpose. In this he imi-  
 tates some other mesographists of his time,  
 who, like conjurers in a circle, made all vir-  
 tue to consist in the middle. But Mr.  
*Woolhouse* had observed, that the operation  
 is neither so easy nor so successful, when the  
 needle is placed just in the middle of the  
 pupil, as when it is placed about half a line  
 lower : for in this latter way, though we  
 deviate from *Celsus’s* rule, ‘ just against the  
 ‘ middle of the Cataract’ (*è regione mediæ  
 suffusionis :*) yet we avoid many great diffi-  
 culties that occur in the operation, when ac-  
 cording to his repeated prescriptions.

By this manner of placing the needle a  
 little lower than the middle, we depress the  
 Cataract also more entirely, as well as with  
 more facility, the body of the needle thus  
 weighing upon the body of the adventitious  
 substance : whereas when the needle is placed  
 higher, the point only touches the Cataract  
 as it descends, which frequently occasions its  
 bursting or tearing. The Cataract is also  
 thus laid much lower, by reason the needle,  
 as it were, covers and embraces it.

Farther, this method carries the oculist  
 through the most delicate and ticklish part  
 of the operation, in which the antient prac-  
 titioners, who worked by *Celsus’s* rule of the  
 middle,



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middle, frequently failed : for as the needle, in their way, was introduced farther into the eye, to traverse the middle part of the globe ; it followed, that as the Cataract was lowered, the operator was obliged to draw back his needle by little and little, for fear of tearing the uvea : and as this pulling back the needle was apt to make the patient start at the motion, the needle was in danger of being entirely plucked out of a sudden ; the consequence of which must be, that the watry humour would necessarily issue forth at that instant.

Indeed this, though an ugly accident, may appear to many worse than it really is, the aqueous humour naturally repairing itself in fifteen or twenty hours space. But this exclusion of the aqueous humour ought, at least, to convince the gentlemen on the other side of the question, that the needle is infallibly placed in the volume of that humour, and not in the middle of the vitreous : for were the needle placed in the middle of the vitreous, the aqueous could not be let out, as it frequently happens, in this operation.

Again ; the Cataract in couching frequently passes through the hole of the iris, in the first region of the aqueous humour. Now it is almost impossible to hinder this accident, if we place the needle, according to *Celsus's* rule, over-against the middle of the Cataract :

ract : but when it is placed lower, it naturally opposes itself as a bar, and hinders the passage of the Cataract into the first region.

*Fourthly*, Most Cataracts, by reason of planting the needle according to the direction of the antients, are not really lodged at the bottom of the eye, in their proper artificial seat, but in the cavity towards the temporal angle. This accident being unavoidable in the antient position and way of working, it was to prevent it that Mr. *Woolhouse* invented a peculiar Cataract needle, which he placed in the greater canthus, and so dislodged the Cataract that was adherent inwardly towards the lesser corner, which had been, in all ages, the constant rock of offence in performing this operation.

In a word, the oculist's art seemed to have been at a stand for above two thousand years ; no operator, before this gentleman, finding a way to remove the obstructions it had met with.

*Fifthly*, By planting the needle in the new manner, the operator avoids the perilous turn of the *summer-fault* [i], the most dangerous he can give the needle ; not one oculist in a hundred having address and evenness of hand enough to perform it successfully, without endamaging some inward part of the eye.

[i] By this he seems to mean a sudden catch, jerky or leap of the hand, the word signifying a gambol.



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This operation consists chiefly in rooting or grubbing up a Cataract, that is woven down at the bottom of the eye, and there sticks so fast, that all the operator can do will otherwise prove ineffectual: for the body hath such an elasticity or spring, by reason of the fine threads woven or rooted below, that the Cataract rises as often as it is depressed, till the threads are loosened or separated: it must therefore be spitted, as it were, turned topsy-turvy, and rolled into the second volume of the eye, till all these threads and fibres, that make it adhere to the uvea, are broke.

This operation is easy enough to perform successfully, if the needle be placed about half a line, more or less, lower than the middle so inculcated by *Celsus*.

The new way of planting the needle is likewise very proper to prevent the comminution mentioned by the same author, by which he meant the mangling or cutting the Cataract when it remounts, after it has once been couched, and takes its former station and tension in the second region of the aqueous humour: for it is the needle's point that generally occasions the oculist's want of success, and reduces him, against his will, to slice and dissipate the Cataract, which his intention was to depress entire. But when he sees that the point of his needle has accidentally taken off any part of the body,  
he

he is apt to proceed in the same way of working, thinking he has found a proper subject for that purpose: whereas, unless he has a very light and even hand, he will certainly cause great havock in the inward part of the eye, and produce there a great suffusion of blood, by the rupture of several of those vessels that constitute the tunica choroides, which some of the antients, with good reason, call the tunica vasculosa. It is indeed a mere tiffu, plexus, or as it were a retina mirabile, constituted throughout of double vessels, but chiefly of a venous and arterial circle, either of which being wounded will infallibly produce an Hypopyon, and frequently the Empyema itself.

*Sixthly*, By so placing the needle, according to Mr. *Woolhouse's* discovery, the oculist runs not the risk of broaching the Cataract, as it is technically called; that is, of running the needle through the body of it: which when it happens, the needle must always be drawn back, or taken out of the eye, because the Cataract will follow it in this disposition, and therefore never can be couch-ed but upon a new puncture: in making of which the oculist should be very careful to avoid his first fault, directing his needle quite to another part. But when the needle is at first planted low, according to the direction here given, there need be no apprehensions



Prehensions from this accident ; the needle being able to lodge the Cataract without any constraint.

These observations and reflections may suffice to shew, that theory and practice ought to go hand in hand, and to enlighten one another. Theory without practice is but a lame and blind guide, which will lead him who follows it into a ditch : but practice joined with theory may be well compared to the lame man, whom the blind man carried upon his shoulders, whereby both went on safe, and avoided all dangers in their way.

Mr. *Heister* ran into another extravagant mistake, in his apology against Mr. *Woolhouse*, as to the fashion of the needle itself. He was led into it by the pretended discovery of M. *Brisseau*, who palmed upon the world as his own an old invention of *Solingenius*, who in his surgery makes use of a grooved, or fluted needle. Oculists of former times have, indeed, made use of this sort for depressing the Glaucoma : but *Brisseau*, pretending there was no such real distemper as a membranous Cataract, appropriated to himself the invention of that old fashioned needle, which all oculists had abandoned forty years before, on account of the ill consequences attending its use.

For example: it naturally lets in the air in its cavity, and gives an easy vent for the extravasation of the aqueous humour. It was ill invented at first even for the lodging of Glaucomas, since a common flat Cataract needle, that can couch a thin membranous Cataract, will *à fortiori* serve better, and take more hold of a Glaucoma, which is thicker and more substantial. Nor can this hollow ever hit so exactly as to enclose the rims of the Glaucoma in its cavity, as the advocates for it pretend. Mr. *Woolhouse* and several of his pupils had made use of it in very well disposed Glaucomas, but always without success; the needle being too broad and too long, whereby the eyes all perished in which it was introduced.

It was an observation made by Mr. *Woolhouse*, which Mr. *Heister* afterwards assumed to M. *Brisseau* and himself, that in beasts there were at least twenty real Glaucomas for one true membranous Cataract, and that in old Men also were found great numbers of Glaucomas. But we shall not enter into all the disputes between these gentlemen, many of which were published in the literary journals, and others in separate tracts. We will only observe upon the whole, that Mr. *Woolhouse*, on this occasion, laughed at his antagonists for mentioning membranous Cataracts, when by their system they had not allowed of any such thing; nor of  
any



any such thing either as what the schools of physick and surgery had always called a Glaucoma of the chrystalline, but only a Glaucoma of the vitreous humour. Mr. *Woolhouse*, on the contrary, proved unanswerably, that there was never any Glaucoma of the vitreous, without a glaucomatic affection at the same time in the chrystalline. Nay, he maintained, that of all the pretended Cataracts his adversaries produced, though real Glaucomas of the chrystalline, there was not one accompanied with a glaucomatic affection of the vitreous; challenging them to shew one Glaucoma, agreeable to their own system, in the vitreous, the chrystalline remaining sound and transparent. It was for this reason that *Galen*, and all his successors among the antients, taught that the vitreous humour is the true chyle or nourishment of the chrystalline.



## C H A P. XIII.

*Pursuit of the remaining operations  
of the Cataract.*

**T**HERE remains to be discoursed of among the operations of the Cataract, next, the fenestration, windowing, or boring; which is never practised but when the Cataract is inseparably adherent to the inner borders of the pupil, hindering its alternative opening and shutting. In this case the oculist must with his needle pierce the Cataract just in the middle of the pupil, and then continue pricking it full of holes, as close together, and as much in rows as he can. When he has done this, let him put the point of his needle in the uppermost hole, and draw it gently down, doing thus with all the ranks of holes from top to bottom; by which means he will make one great hole in the Cataract, through which the patient will see moderately well all manner of objects.

This operation must be performed in the best light the oculist can procure, but always a side light. It again shews the  
error



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error of strollers and mountebanks, who work in the open air, which causes so great a restriction of the pupil, that the operator generally leaves a circle of the Cataract, a line or two in breadth, adhering inwardly round the eye-ball. Any one may see this by placing a patient that has been so couch-ed in a shady light, where the pupil dilates itself. So that these quacks perform this work of fenestration on almost all occasions, when the case perhaps required, and they might easily have executed, the compleat o-  
peration, had not self-glory been more in view than the recovery of their patients.

Another species of Cataract we have mentioned, is woven like a web in the very hole, eye-ball, or pupil. This must be relieved, first, by rubbing on the outside of the eye, to make the pupil dilate itself as much as possible; and then, having placed the patient in a moderate light, the window on the cataracted side, the oculist must cut very delicately the extremities of those fine threads, till he loosens them, and as it were unfetters the eye.

This sort of Cataract should be attacked in its very birth, without any time being given for the ordinary course of ripening; because the stronger the threads are, the less hopes is there of saving any eye-sight: For when these threads become cartilaginous, they require a great force to break them: in  
doing

doing of which, if the oculist has not infinite skill and precaution, he will be apt to convulse and distort the pupil, and may chance entirely to close it up, as if the iris had been naturally imperforated.



#### C H A P. XIV.

*Of the causes, operation, &c. of the  
Glaucoma.*

**W**E come now to the deposition of the Glaucoma, commonly called the collocation of the Glaucoma, or curing of the wall-eye: this is the seventh in our list of operations.

We have already observed, that no Glaucoma of the chrystalline must be operated upon till it is entirely ripe, that is, till it has quitted in a great measure its sinus in the vitreous humour, and advanced forwards into the aqueous humour, in the very place of the membranous Cataract. Experience wil soon teach any attentive person to know this crisis, and it is want of attention to this only true mistress that has made modern operators, and writers upon this subject, commit so many blunders. Hence we read in  
all



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all books, that the diagnostic difference between a Glaucoma and a Cataract consists in this, that the former is deeper in perspective than the latter, which adheres to the uvea, and so is very near the pupil: whereas this is true only in the beginning of Glaucomas, and not in their state of maturity, when they shoot, as oculists call it, or fall of themselves, through their own weight and dryness, and the dryness of the ciliar processes. At this time an able oculist may be puzzled to know a Glaucoma from a Cataract, to do which he must attend to the following diagnosticks.

In the beginning of a Glaucoma the patient's sight is gloomy and thick, as in foggy weather. He has usually had some time before either a fever, great pains in the head, or has been guilty of some excessive debauch with women or wine. Much study, watching, writing with the head downwards, vomiting, a fall, a blow on the head, a flash of lightning or gun-powder, a blast, sleeping in the sun, or in bed with the face downwards, carrying great burthens on the head or back often, constant working at the fire, the use of aqua fortis or quicksilver, having the feet and arms much in cold water, working or reading with the sun in the eyes, constant obstructions of the nose and salival glands, long costiveness, suppression of the menses in women, or hæmorrhoids  
in

in men that have been subject to them, a scald, damage from an erysipelas, wet smoke, epileptic, apoplectic or hysteric fits, long travelling in violent hot weather or in snow, much weeping, defluxions of the eyes returning often, immoderate use of eye-waters, the king's-evil, the foul disease, a gonorrhœa virulenta too soon stopped, much sweating, or on the contrary no perspiration, frequent shaving and cooling the head, all astringent repellent narcotic topicks applied to the eye, blood-letting either much or only once in the paroxysms of the fever, immoderate use of ice or cold refreshing liquors, brandy or other spirituous liquors applied to the eyes, or rubbed on the head after shaving; either of these may be the cause of a Glaucoma. In myopes, or purblind people, it may be only a natural and gradual obduration of the chrystalline.

This distemper sometimes appears to the patient like little spangles, according as some particles only of the chrystalline humour are obstructed; and sometimes like a blotch or dark spot, when the aranea grows dark just in the middle, which is the general case, that part of the chrystalline being usually first obdured.

In cases of general obstructions, when a person neither sweats, spits, nor has other common evacuations, the chrystalline will be apt to grow heavy, and as it were benumbed,



dumbed, for want of motion in the humour; which will occasion a loss of sight, total or partial, for some moments: but by desisting from what one is about, and rubbing the eyes so as to recall the animal spirits, and put the humours in motion, this may be commonly relieved.

*Gassendus*, in his life of *Pieresk*, tells us, that that learned man used to have the visible impression of outward objects fixed in the humours of his eyes, and easy to be perceived by a person that looked into his pupil, after he had been weary with poring on any particular object. *Hippocrates* says, the eyes and ears are hurt *à pituita confirmata*. In general, those who want the evacuations by the mouth and nose, unless they urinate more than other people, are both thick of hearing and dull of sight, according to Mr. *Woolhouse's* observation.

As to Cataracts, they happen to persons of all complexions and constitutions, without any previous perceptible symptom. Very frequently a small accident relaxes some of the adducent vessels of the aqueous humour, by which they filtre thick and undigested liquor, that the abducents are too fine to carry off into the ordinary way of circulation. Now this particle of heterogeneous liquor floats in the aqueous humour, either till by a new addition and accretion of heterogeneous particles it becomes a Cataract, when the adducent ves-

fels cannot recover their primitive tones, or till it is cured of itself in course of time, and the phenomenon proceeds no farther. This is the reason that so many people see atoms of different sorts and figures move before their eyes, continually changing place: for when the evil is in the chrySTALLINE humour, then it remains always fixed, and is glaucomatic; but when in the aqueous, it varies according to the flowing of that humour, and is cataractic.

The Cataract appears sometimes like a thread or web, sometimes like a fly's leg, sometimes like a whole fly, spider, or caterpillar, sometimes like a lattice or piece of gauze, sometimes like a bird, sometimes like a worm-eaten leaf fallen from a tree, and in several other figures, according as the heterogeous liquor happens to shoot from the relaxed adducent vessels of the watry humour. Hence 'tis that some never have their Cataracts ripe, others only in the process of many years, according to the number of watry vessels that are hurt, while others have them ripe in ten days, or even so little as one day. With the same difference the self-curable ones are of longer or shorter duration.

But Glaucomas are always round, or of a lenticular figure, according to the form of the chrySTALLINE. Here then is an essential difference between the two diseases.

Indeed



Indeed Cataracts generally appear round likewise, to those who look at them from without, because they can be seen only through the hole of the iris, which is round. But a close observation will shew the Cataract adhering to the inside of the fringe of the iris, and even the threads that attach it will be seen by looking attentively on one side: whereas the Glaucoma touches not the iris unless it be unsheathed, and fallen out of its sinus in the glassy humour, which in time becomes the case of all that are thoroughly ripe and hard: then it is that there is no distinguishing one from the other by a short inspection, and feeling is the only way to obtain satisfaction.

Such a hard and dry Glaucoma, pressing upon the inside of the iris, first dilates the pupil, and then makes it immoveable and inelastic, as a stone extends the sling: but if it happens to fall upon the iris when the pupil is contracted, or well nigh shut, it then hinders it from opening and dilating any more. Upon this accident the fore-part of the eye will feel harder than usual to the finger; and upon reclining the head backwards, and rubbing the eye, the chrySTALLINE humour will fall back with a perceptible noise, and leave the fore-part again softer.

Glaucomas are either simple or complicated: simple, when the chrySTALLINE humour

mour is become opaque by dryness, or the influx of heterogeneous matter, that changes the constitution, and fills up the pores, making this humour bigger than it ought to be; as in most humid Glaucomas, whereas the dry sort render it less than the natural state: complicated, when there is a Cataract before the Glaucoma, and behind it a glaucomatic affection of the vitreous humour. It is also not unfrequent to find a dissolution of that humour with a Glaucoma.

In the number of Glaucomas come naturally all ulcerations and abscesses of the chrySTALLINE humour, which are very common. *Antoine Maitre le Jan* was therefore much mistaken when he took them for Cataracts, having been deceived by outward appearances, and thinking the morbid matter issuing from the body of the chrySTALLINE was the matter of the Cataract. He had first given this definition of a Cataract, ‘the chrySTALLINE humour become opaque, with a certain extraneous body adhering on its surface, by way of appendix.’ By which one plainly perceives that he took for a Cataract this abscess of the chrySTALLINE humour, which is altogether incurable as to the sight. Though after much pain and suffering, as in the empyema, the chrySTALLINE shrivels up, and frequently falls out of its sinus in the vitreous, when the pupil clears up, and has no visible defect but the  
loss



## *Cataract and Glaucoma.* 101

loss of spring in the iris, the flatness of the cornea, and a sort of pappiness upon the pressure of the finger, which occurs not in a true Glaucoma, nor in a Cataract.

We said before, it is impossible to judge between a true Cataract and a right Glaucoma at first sight. To be secure therefore, the oculist ought farther to place his patient in different lights, and to see him at different seasons, fasting and full, at sun-rising and after sun-set, and if it be a woman at different seasons of the month; all these circumstances making a considerable variation in the specific diagnosticks; that seeming a Cataract fasting, which we find to be a Glaucoma after dinner, and that to be a Glaucoma in the morning, which at noon we perceive to be otherwise. These changes are occasioned by the various restrictions and dilatations of the pupil, and the plenitude and vacuity of the whole eye. The same differences occur after taking of physick, letting blood, or going through other customary evacuations.

Nor do they regard only the distinctive characters between a Cataract and a Glaucoma, but are also to be consulted with regard to the ripeness of either, and forming a true prognostic upon the success of an operation. The oculist must not therefore precipitate his judgment, nor draw conclusions without interrogating the patient very  
precisely

precisely as to the symptoms he feels, and the origin of the accident; at the same time making his own observations.

It is a good way to prick a hole in a card with a large pin, and make the patient look through it, applying the even side of the card, where the pin enters, to the pupil, and shutting the sound eye at the same time: he will then see the different webs and contextures of the Cataract, which he may himself describe or draw upon paper, and note the increase of his distemper from month to month. If it be a Cataract, the phænomena will change their situation, more or less, at least in the beginning, when the motes float in the watry humour; but in a Glaucoma they are always immoveable.

The oculist should keep an exact journal of all the patients that consult him upon either of these distempers, and every two or three months he should be sure to see them, and take an exact draught of the obstruction, in order to observe the increase since the former visit; neither Cataract nor Glaucoma being often curable after a certain age, for instance that of puberty, without the specific operation. But Mr. *Woolhouse* had cured many lads of both before their voices were broke, and girls before their monthly visitations: and even afterwards, some few, in whom the distemper was still growing. We have  
men-



## *Cataract and Glaucoma.* 103

mentioned *Hippocrates's* rule, not to meddle with children under seven years of age; from which our modern also sometimes deviated with success.

There is a distemper peculiar only to the milky Glaucoma, commonly called the milky Cataract, and sometimes the bog Cataract. This is frequently a real Glaucoma, where the chyle of the chrySTALLINE is not perfectly digested and purified. It is a long while in ripening, sometimes above twenty years. As to the operation, it consists in introducing the needle into the middle of the eye, and pricking the chrySTALLINE on its edges, in order to give issue to the chylous matter, which subsides to the bottom of the eye, whitening for the present all the watry humour: but this clears up in about a week, and frequently the chrySTALLINE recovers both transparency and figure, by the generation of a new chrySTALLINE substance: just as the aqueous, when it comes out in the operation of the parakentesis, is naturally renovated, at least with the use of proper remedies.

C H A P.



## C H A P. XV.

*Other ways of operating on the Cataract, with the sequel of the operation.*

**T**HE ninth way of working is called analepsis, the suspension, or hanging up of the Cataract. This operation has place only when one cannot loosen the Cataract above, but it yields to the needle below, where when it is unhinged, the fibres above contracting draw it upwards, where it remains, and leaves the greatest part of the pupil uncovered: so that the patient sees objects perfectly well, especially in a shady place, where the pupil is much dilated. This operation is just the reverse of that called the summer-fault.

The tenth operation is when the Cataract or Glaucoma has passed into the pupil, between the cornea and the iris. It is called extraction of the Cataract or Glaucoma, and consists in a longitudinal section of the cornea, a little below the opening of the iris. The reason of making it here is, that as there will remain a dark cicatrix after the cure,



## Cataract and Glaucoma. 105

cure, the sight would be obstructed by it, more or less, if it traversed the front of the pupil.

To perform this operation, the patient must be placed in the shade, where the pupil may be as much as possible distended: then planting the glaucomatic needle in the cornea, a line's distance from its outward circle on the temple side, and making it come out on the nasal side a line's breadth also from the circle; with a lancet made for the purpose, that must be no broader than a Cataract needle, and cuts only on one side, make an incision according to the direction of the needle, the whole length of its entrance. The patient must be turned up on his back in the instant, without pillow or bolster, and the Cataract or Glaucoma drawn out of the first chamber of the eye, with an instrument made also for the purpose.

But when the Cataract is not so large as to offend the eye, or obstruct the sight (as Glaucomas always do) the repression or reposition of the Cataract should be put in practice. This consists in making it re-enter the second chamber of the eye, where it had broke forth. It is much the same operation as the famous *Justus* invented in the hypopyon, of which *Galen* gives us an historical account. The patient must be laid at the feet of a bed, his head about a foot lower than his body, so that his chin may

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point

point upwards: the oculist must rub gently with his thumb the lowermost part of the eye, looking frequently if the Cataract changes place; and when it comes to the pupil, he must raise the patient's head, and lay it even with the rest of his body, till the Cataract enters the eye-ball; and then lifting the patient suddenly upright in his bed, the Cataract must be left to rest till it subsides of itself gradually into the bottom of the eye, in the natural place, between the ciliar ligaments and the reduplication of the iris. This operation is usually called the transportation or translation of the Cataract or Hypopyon.

Our operation being thus finished, and the compresses, dipped in the usual defenitive, laid upon the eye, the patient must not be dressed for six hours at least in winter, and three hours in summer. The defenitive is thus made: ℞ rose and fennel-water, of each alike, and two thirds of vervain-water, beat up with the white of a new laid egg: to every four ounces of this composition use half a scruple of powder of roch-alum, with six grains of sach. saturni: beat these up into a froth; then dipping cotton, wrap it up in a fine old rag, washed without soap, and dipped in any of the preceeding simple-waters. The rag itself must never be dipped in the compounded collyrium, for fear of its offending the eye-lashes.



## *Cataract and Glaucoma.* 107

The patient must always have a little bell in his hand, to call for what he wants, whether he be in bed or in his chair, which should be an easy one. Neither of his eyes must be opened at any of the dressings, and the compress must be drawn downwards over the eye-lid, always cold.

In case of any great pain or shooting, after a tedious operation, the eye may be opened in six or eight hours, to see how to prevent future bad consequences. But the best means in cases not extraordinary, is letting blood in the foot.

The candles must never be held before the patient's eyes, which should be fomented and cleansed every time with warm water, for the space of a quarter of an hour before they are opened. If there be a vast inflammation, one ocular scarification will do more good than many repeated venæsections.

After four or five days we take off altogether the compress of the sound eye, and the eighth day at farthest we free the cataracted eye likewise, using the patient gradually to the light by opening the window-curtains. He begins his ordinary diet generally the fourth day, having been supported before by broths, eggs, and jellies. He must neither read, write, stoop to put on his shoes or stockings, or for any other necessities; nor look upon the light, fire, can-

dle, or any white object : he must not ride on horseback, nor go in any jumbling vehicle : he must avoid tobacco and snuff, be moderate in drinking wine, and abstain entirely from venery, for two months, at least, after the operation. When he begins to write and read, he must make use of a Cataract spectacle, which he must be careful in the choice of, trying dozens to find which suits him the best, and those by the best opticians.

If the patient happens not to go to stool, the fifth day a laxative glyster may be given him, as much preferable to a purge : and if the eye is subject to redness, a compress of oxycrate, outwardly applyed every three hours, and a collyrium of dog-rose-water, (to three ounces of which put a scruple of tutiæ ppt. and four grains of pulv. aloes succōtr.) will be of excellent use at night and morning, when the patient is in bed. Three or four drops of the clear thereof, warmed in water, must be dropped into the eye, holding the lids open gently, till it distributes itself equally under both : always however taking this precaution, never to use any kind of collyrium in the eye, till the hole made by the puncture in the operation is entirely healed.





# APPENDIX.

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N<sup>o</sup>. I.

*Extract of a letter to Mr. Woolhouse at Paris, upon the subject of this treatise.*

*Nuremberg, Nov. 20, 1728. N. S.*

**Y**OUR opinion, concerning the membranous Cataract, is very well-grounded ; as it is supported not only by a great number of experiments, but also by the explanation you published concerning that matter, in your dissertations upon the diseases of the eyes, and in several journals of the learned and memoirs of literature, which I have read with

with a great deal of pleasure and profit to myself. Every one of our physicians and surgeons in *Germany*, who examined it narrowly, and with the attention that so nice a subject requires, agree now with you in that point, as well as Mr. *Heister* himself, in two editions, *quarto*, of his treatise on surgery, written in *High Dutch*; though he has since been pleased, in a third edition of his *Compendium Anatomicum*, to affirm, he had absolutely defeated you in the dispute you have had concerning the relative greatness of the two chambers of the eye. But he does not answer half your objections on that point, under pretence that his book is but a *Compendium Anatomicum*. This third edition is, notwithstanding, very much enlarged by the addition of things much less useful, and much less difficult to unravel.

Give me leave then, Sir, to impart a fact to you, I was an eye-witness to at *Ingoldstadt*, towards the middle of the year 1724, whether I went to see the learned Dr. *Morasch*, an eminent professor of physick and anatomy in that university of *Bavaria*, with a design to obtain some operations of the Cataract from him. I found him very much prepossessed with an opinion in favour of the new system, which makes the Cataract to consist in the opacity of the chrystalline; and whatever I could object against this

hypo-



hypothesis, the professor was obstinate, grounding his opinion upon certain dubious, misunderstood, or fictitious experiments of Messieurs *Antoine*, *Brisseau*, *Heister*, and other new writers of the present age. These had been sent from *Paris* to Mr. *Heister*. The only thing, and the most that can be proved from thence, is the existence of the *Glaucoma*, which is allowed to be an opacity of the chrystalline, and that there are indeed more of those *Glaucomata* than true *Cataracts*, as you have evidently proved before any other person, when you reformed the doctrine of the antients on this important article, in several of your dissertations on the eye, as well those written in *French*, as those you published in *Latin*, and in your papers dictated to Mr. *Geisler*.

Now to return to Dr. *Morasch*. He asked me whether the *Cataract* might not be found behind the iris, and at the bottom of the pupil, in the eye of a person who had been couched very well about three years before, the *Cataract* having been entirely removed from the uvea, having never risen again, and the person having enjoyed his sight perfectly ever since the operation.

I answered Dr. *Morasch*, that Mr. *Geisler's* six experiments at *Nuremberg*, had indeed very well made out the affirmative of his question; but however it might be possible

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sible that a light thin Cataract, being separated from all its small threads and roots that gave it nourishment, and wanting juices to nourish itself, might at last be reduced to its primitive original, and carried away by the abducent vessels of the aqueous humour in the usual way of circulation. Moreover I had seen, at my father's (an oculist and lithotomist of long standing at *Nuremberg*) several incipient Cataracts entirely dissipated by means of internal medicines; and external applications commonly made use of in the like cases, with good success by my late father. Besides our eldest oculist in *Germany*, *George Barrejon*, gives an account of several instances, or like cures of suffusions, in his *Aug. Discut.* — Mr. *Heister* greatly commends this author, though he will not admit that the Glaucoma of the chrystalline be curable.

To this Dr. *Morasch* made answer, We shall go to-morrow and see which assertion of the two is truest. Accordingly the next day he carried me to a friend of his, who had died about two days before, and three years before had been couched by Mr. *Richter*, a *German* oculist. After he had drawn the eye out of the orbit of the head, and dissected it, we found all the three humours of it clear and transparent, the aqueous humour not being in any manner turbid, muddy,



muddy or mucilaginous: the chryſtalline humour perfectly diaphanous and entire, and in its natural ſituation, *i. e.* in the glaſſy humour, which alſo was very clear and pellucid, as it ſhould be. In ſhort, this eye did not ſeem to have ever had any Cataract at all; and Dr. *Moraſch* was fully convinced of the probability of my opinion, and of the real exiſtence of Cataracts as membranes, and foreign bodies that have their origin in the aqueous humour: for the moſt antient authors have never aſſerted that the Cataract is a true membrane, but only a concretion, in the manner or form of a texture, or membrane, *veluti* or *quasi membrana*. Ever ſince Dr. *Moraſch* has taught this doctrine to all his diſciples; and as he has aſſured me, that he had often ſeen ſeveral operators of diverſe nations perform this operation, he is a very competent judge.

I have been told that Dr. *Moraſch* has ſince cauſed this notable experiment to be inſerted in the journals of the experimental philoſophers in *Germany*, whereof he is one of the chief members. As you have given ſeveral inſtances of the total melting away, and abſolute diſſolution of the chryſtalline humour, and as I do not remember to have ever read in any of your writings an inſtance of the total melting away of the true Cataract, I

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hope

hope this experimental proof cannot be in any ways unacceptable to you. I am, however, assured that upon Mr. *Lasneir's* (a surgeon) dissecting an eye in the presence of Messieurs *Gassendi* and *Robault*, two eminent and well known philosophers, nothing likewise of a Cataract was found in it, though it had been couched.

*I have the honour to be,*

*Sir,*

*Yours, &c.*



N<sup>o</sup>. II.

*Extract from the history of the*  
 ACADEMY ROYAL of SCI-  
 ENCES.

**T**HE question is, whether there are membranous Cataracts? or whether Cataracts are any thing else, than a vitiated, opacous, and glaucomatic chrySTALLINE?

The antients were for membranous Cataracts.

Mr.



Mr. *Woolhouse*, the most famous oculist among the moderns, because, besides his daily practice, he had a most extensive and profound theory, has somewhat moderated the assertions of the antients, by shewing that membranous Cataracts were not so common as the Glaucomata. But several other modern virtuosi, who have alternately appeared on the stage, without agreeing to this just medium, (which seems the most conformable to reason, though it were only because it is a medium) have chosen the other extreme, and asserted that there were no membranous Cataracts, but only Glaucomata.

One of the most famous sticklers for this modern system was Mr. *Heister*. The engagement between him and Mr. *Woolhouse* was very rough, and indeed, more than became persons of so great a figure in the commonwealth of learning: but finally, facts judicially proved constrained Mr. *Hiefter* to retract, and accede to the wise medium proposed by Mr. *Woolhouse*, and agree with him, that membranous Cataracts were rare, but real.

After so compleat a victory, and several experiments no less authentick, one would have thought, that we were now on the point of reaping the fruits of all those disputes: but on the contrary, Dr. *Petit*, a phy-

fician, revives the dispute, and strongly asserts, there are none other than Cataracts purely glaucomatic, exclusive of membranous ones. No question, but this academician, who has acquired no small reputation, has new arguments and fresh experiments to oppose against a system espoused by Mr. *Woolhouse*, and Mr. *Heister* at present, and their joint experiments. He has truly collected some, and those very cogent; but seems, in the building up of his system, to have sown seeds of ruin, which an adversary, such as he has to deal with, will make good use of, since the Doctor builds upon the authority of Mr. *Heister*, who is now so much the more opposed to him, as he was before most obstinately and strenuously on his side. However, Dr. *Petit*, in his essay inserted in the history of the Academy of Sciences, touches only upon the historical part of the Cataract. 'Tis pity he did not know that *Hippocrates* was acquainted with this disease, and the cure of it, and that chance, by the assistance of beasts, has taught men how to perform this operation, as they have done several others.

His researches, on this account, are very learned, but his inferences are hypothetical. Nothing is more ingenious than the systematical turn, with which he represents the oculists, as knowing first that in removing  
the



the Cataract they removed the chryſtalline, not knowing that this chryſtalline was one of the chief organs of ſight; and afterwards knowing the uſe of this organ, and yet taking a pleaſure, and even affecting not to know that it was the chryſtalline they removed, by the name of a Cataract. For what likelihood is there, that one ſhould deprive a man of the organ of ſight, to reſtore ſight to him that had loſt it? The modern oculiſts are better apprized of the matter they know and agree, that the chryſtalline is one of the chief organs; notwithstanding which they remove it in thoſe whom they couch. This is, *ipſo facto*, plucking out a perſon's eye that he may ſee the better.

There are no doubt a great many curious things to be ſaid for and againſt this matter; but in order to decide the queſtion finally, it ſeems that the whole amounts to this, *viz.* to ſhew either that the chryſtalline is not an organ eſſential to ſight, or that ſight can ſubſiſt without one of its eſſential organs. For when one ſays that a Cataract is a foreign body, a membrane, a curtain, that accidentally forms itſelf before the chryſtalline; every one who underſtands natural philoſophy, any man of good ſenſe conceives, that upon removing this curtain, ſight is inſtantly reſtored to him, who had  
loſt

lost it through that means. But hitherto, no natural philosopher has been able to understand how one can be restored to sight, by removing one of the chief organs of sight. It is therefore absolutely necessary, that facts of an undisputed veracity should be first brought, to make this strange paradox go down ; which, until the truth of it be demonstrated, has even no right to pass as possible.

*F I N I S.*

