

**The human sensorium : investigated as to figure by a course of pressures on the eyes, and by the induced phases and bearings of those sensations of colors called peacock's feathers : being a second supplement to the Rationale of cerebral vision / by John Fearn.**

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THE  
HUMAN SENSORIUM

INVESTIGATED AS TO FIGURE

By a course of Pressures on the Eyes, and by the induced Phases and Bearings of those Sensations of Colors called Peacock's Feathers; being a Second Supplement to the Rationale of Cerebral Vision.

BY JOHN FEARN, Esq.

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“ When a man in the dark presses either corner of his eye  
“ with his finger, and turns his eye away from his finger, he  
“ will see a circle of colours like those in the feather of a  
“ peacock's tail.”

SIR ISAAC NEWTON'S OPTICS.

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“ And these things being rightly despatched, Does it not  
“ appear from the phenomena that there is a Being, incor-  
“ poreal, living, intelligent, omnipresent, who, in infinite  
“ space as it were in his sensory, sees the things themselves,  
“ intimately and thoroughly perceives them, of which things  
“ the IMAGES ONLY, carried through the organs of sense into  
“ our little sensoriums, are there seen and beheld by that  
“ which in us perceives and thinks?”

SIR ISAAC NEWTON'S OPTICS.

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## P R E F A C E.

THAT Visual Modification of the Mind—in other words that Circular Mass of Sensations of Color—which has by Sir Isaac Newton been likened to “*the feather in a peacock’s tail*,” is a phenomenon which opens to us a road to the investigation of the nature of the Sentient Subject that never could have been afforded by vision from Light, since it is impossible that light, reflected from external objects, can be made to fall upon the eye so as to impress the retina upon many of those points, which it is necessary to impress in order to induce visual phenomena in the situations, bearings, and mutations, which alone can indicate, in any extent however small, the *Physiological Condition or Figure* of the Sentient, the investigation of which, as far as may be done from certain data, is the purpose of the present supplement.

At the same time, it claims remark here, as an important example of oversight, to what an extent this species of vision has been neglected; while its existence is so obvious, and even so obtrusive upon the notice of all men, that scarcely any human being can be altogether ignorant of the fact. The case of Sir Isaac Newton; and that of Dr. Porterfield, who wrote so largely on Vision, and who held as strongly for the existence of a *Sensorium*, against the denial of it set up by Dr. Reid, as Newton himself would have done had he been in life; would have appeared to me almost impossible, were it not that an equal extent of neglect has happened in my own case, during twenty years after I had actually experimented a course of *general* pressures on the eyes, with a view to determine the physiology of our visual sensations; at which time, I was perfectly aware of the *existence singly taken*, though I never thought of seeking for the *plurality or multiplication*, of the peacock’s feather.

Some good may be derived from the fact, now adverted



to, if it serve to render future inquirers vigilant against similar oversights. At any rate, the cause, in all the cases, has in all probability been the same. Neither Newton, nor Porterfield, had any view toward the Figure of the Sensorium, especially not through the medium of VISION; they, certainly, not suspecting that any road was open to such an investigation, unless through ANATOMICAL research. And my own view, at the time of my employing the general pressures abovementioned, was equally without any such anticipation; my object at that time being confined to a demonstration, or proof, of the *Extension only* of the Sentient, by proving that of our visual modifications. It may have happened, however, in both, or one, of the other cases; or, at least, it may happen on some future occasion; that an Experimenter, unless advised on the subject, might be deterred from the research by a fear, or reluctance, to tamper with the eye. On this account, I deem it proper to intimate that, although I have experienced some forbidding effects of looking *much at strong lights*, and otherwise from *straining the eye in any way with looking at all*; (any of which cases is likely to happen only when some act of *external* vision is going on;) the result of pressures with pins' heads on the eyes, employed with intervals for hours in the day, and repeated daily for weeks, and even months,—has been wholesome, or improving, to my own eyes; one of which has always been rather weak, and very dim sighted. It is probable, I have persevered in this course to an extent which few; (and, certainly, no one but an earnest lover of inquiry into the nature of his own mental constitution,) will care to imitate. But, from employing the pressure short of pain; and desisting when the eye became unduly moist, or in the least degree irritated; I have experienced no bad consequence from the practice, but, I think, benefit.

From the tenor of pages 162, 163, of the Rationale, it will appear that I therein contemplated an additional Sec-



tion to that work; having for its object to trace the farther nature of the Sentient, especially with regard to its Figure and Seat. The state of health, however, which obliged me to terminate the Rationale abruptly, and my being subsequently engaged in the detection and investigation of Color Images in the Brain, have prevented, until now, my resuming any serious attention to this object. Having, in the Supplement on Color Images, expressed the probability that the farther prosecution of the subject must be left to some other hand; I have deemed it proper to explain here, as above, in order that it may not be thought capricious that I have thus resumed it.

In what has on this occasion been effected; I presume it will appear that *another stage* has been added to the knowledge of our Sentient Constitution, beyond that of the existence of Vision in the Head. And whatever may be judged of the completeness, or want of completeness, of the investigation, as far as concerns the FIGURE of the Sensorium; I apprehend, the way is laid considerably open to the inquiry concerning its SEAT; and that, Philosophers are called upon to follow out the subject.

Any additional investigation with regard to the *Figure* of the Sensorium, (and the same perhaps applies to its *Size*;) must, I conceive, be conducted in the way which I have thus far prosecuted,—namely—upon *Pneumatological* ground. But any inquiry with regard to *Site*, I should imagine, will have to proceed upon ground purely *Anatomical*.

London, March 12th, 1832.



## PROPOSITION I.

*Vision from Pressure and Vision from Light are specifically identical in themselves and in their cause.*

BESIDES its bearing upon the inquiry concerning the Figure of the Sensorium, Vision from Pressure has decided another question, which had hitherto been a desideratum as near the foundation of the Physiology of the Mind as that just mentioned, and one which it was necessary to settle, previously to any other step in the direction of mental physiology. The question in itself, together with all that it involves, was no less than whether all our Sensations, occasioned by the several external organs of sense, are of one same genus: Which, if answered in the negative, or only left in doubt, would *mystify* the physiological conditions of the mind, and leave us in an uncomfortable hopelessness of ever being able to advance our knowledge on the road we are now following.

It is sufficiently known that this uncomfortable prospect has been held out to Pneumatologists, in the set attempt of Bishop Berkeley to prove that Extension and Figure perceived by the Sight is not of the same kind with that perceived by the Touch. While the condemnation of that attempt even by Dr. Reid, in addition to the creed of Newton, has not been sufficient to prevent the mischief of Berkeley's Hypothesis, in producing a great Schism on the subject.

The Hypothesis of Berkeley has been opposed by others, and myself, on different occasions, with arguments which I deem to be altogether conclusive: but those arguments, being rather *speculative* than *practical*, were not of that species which could *force* assent, in a case peculiarly obnoxious to prejudice and bias; in which, the subject being a question of *fact*, it is not sufficient to *plead what in reason must be*, but it is required to *prove by phenomena what actually is*.



The known existence of the phenomenon called the Peacock's Feather as described by Newton; in that single phase of it which alone had then gained the attention of Philosophers; proved no bulwark against the distracting hypothesis in question: For, standing alone, it might fairly have been supposed to be only a preternatural, or morbid visual affection,—a mere anomaly in our visive constitution—not capable of being traced to general laws, or a system of vision. In a word; Newton left the subject as a *query*, for future discussion. And, accordingly, it has been so treated by Berkeley. On this account, the immediately following description of the phenomena of Peacock's Feather, in a variety of phases and bearings, (besides referring to those already described in the *Rationale*,) seems proper in order to establish both the *legitimacy and the competency* of Vision from Pressure, for the purpose of determining the physiological condition of the Sentient, in so far as regards its *figure*.

*First.*—We can occasion *several*—that is *two, three, or more*, Feathers simultaneously, from pressure on a *single* eye,—the Feathers always exhibiting *correspondent arrangements of locality*, to those of the pressures.

*Secondly.*—We cannot increase the number of Feathers in a single eye: But this limitation appears to be accountable. Pressure, by even the finest practicable pointed instrument, is a cause of vision so almost infinitely more gross than the impulsion of light through the pupil, that the former must be expected to derange, and exhaust, the visive functions of the retina. And we are at the same time to observe that the *size, or shape*, of a seen Feather, is not that of the pressing instrument; but it is that of the *circular, or other-shaped flexure* which the point of the instrument occasions, and which may vary in *size*, from a quarter, to a half of an inch, or more, in diameter, or length. It is not from want of room on the retina, nor yet in the Sentient, that the number of Feathers cannot be increased: nor is there any want of capacity to occasion *two*



feathers *very near each other*; or, even, to throw the one upon the other, partially, or wholly. But, beyond the number of three, or four, the power of producing these objects, *simultaneously*, is by some means exhausted. It, however, hardly appears that we are materially concerned in being able to assign the precise cause of this, since the *correspondencies between the Pressures and their consequent Phenomena* are all that seem to be essential to our purpose.

*Thirdly.*—As we can hardly manage so clumsy a process, as that of pressure, in any way so as to occasion flexures on the eye of any other shape than *one*—namely, *circular indentations*; this one shape must serve us in nearly all the experiments we can employ in the investigation. But it is curiously satisfactory that we can *modify this in some degree*; although, even if we could not do this, the fact of *figures formed by the arrangement of several Feathers*, simultaneously in the Sentient, would render any figure of *any single Feather, or Object*, an evidence not in the least requisite for establishing the desired result. Thus, upon pressing on the eye with the edge of one of the bows of a pair of nail scissors; I perceived, instead of the usual patch or circular object, a *curved narrow streak*. And, upon pressing with the bow *all round* the eye, with a sort of gyration in the pressure; I saw the narrow streak *continued all round, having the elliptical figure of the bow*. In like manner, on pressing upon the outer angle of the eye with a blunt-edged *straight* instrument; and observing to press *gently*, so as not to make a deep flexure, which would have produced a *circular* object; I saw a *straight* narrow streak, corresponding in its length with the length of the pressing edge. Other trifling variations in the results might be mentioned here: but the statement of them would be wholly superfluous.

From the experiments and results now described, although they are coarse and clumsy in an extreme degree; and I have not cared about taking any means to modify



the fact in any more delicate way ; it is placed beyond the reach of doubt, that, if we could occasion as delicate and defined impressions on the retina by external pressures on the eye, as are occasioned by light entering the eye through the pupil, we should then be enabled, *with our eyes shut*, to see a picture of the External World, or any part thereof ; and might read books, from types stamped upon the closed eye ; as well as we now do with our eyes open.

*Fourthly.*—In confirmation of this specific identicalness of the two causes of Vision—namely—*Light* and *Pressure* ; —If we press upon the *open* eye, (which will afford even *more vivid* objects than when the eye is closed,) it invariably follows that the seen Feather is *coincident with*,—(that is, it *appears upon the same spot with*—) whatever *external* object reflects rays of light, through the pupil, upon *that part of the retina, within*, that is affected by the *pressure from without* ; thus proving that the *nominally-two* physical agents of vision *are in reality one and the same*.

But I repeat, this particularity of evidence, of the identicalness of the causes, appears to be altogether curious, rather than necessary ; since the fact of the *correspondencies* of magnitude, vividness, local arrangement, and *general* shape, of PRESSURES with the OBJECTS which they occasion, must have been all-sufficient for the purpose.

In order to prevent misapprehension, I may here point out that it is *not the same* impression, in these experiments, that occasions a sensation of *Touch* and a sensation of *Color* : on the contrary, we have seen all along, that the pressure which occasions the sensation of *Touch* is on the *opposite side* of the eye, and of the Sentient, to that on which the *Color* appears. The reason of this is, that the pressure is made *immediately* on the eye-lid, and mediately on the sclerotic coat ; both which having nothing to do with producing vision, the impression they convey is *not crossed over in its way to the Sentient* : whereas, the impression made, *still more mediately* through these two coverings, upon the *retina*, is *crossed over* in its way towards the



Sentient; and, hence, the Touch and the Color are felt on opposite sides in the Sentient. Moreover, if the *mediate* impression upon the *retina* were not too delicate to occasion a sensation of Touch, along with that of Color, we should in the above case have *two sensations of Touch*, a stronger and a weaker—one of them being on each side in the Sentient. In proof of this, we find that any violent light, or other such cause, affects the mind, *through the retina*, painfully as a sensation of *Touch*.

The fact that, when the *same individual act* of pressure affects, *respectively*, the *unvisual coverings* of the eye and the *visual lining called the retina*, the impression on the former is *NOT crossed over*, and that on the latter *IS crossed*, affords, of itself alone, a remarkable confirmation, (if any such had been wanted,) of the *adapted mechanism* for the recrossing of visual impressions behind the eyes.

The stumbling-block constituted by the Berkeleian Hypothesis, concerning a generical difference between our various Modes of Sensation, having been subjected to the above tests; I trust we may now proceed, with an interest proportioned to its removal. This Proposition, however, may, by some readers, be read with better effect after the perusal of the Fourth, when they will have gone through the details of experiments.

## PROPOSITION II.

*There is NO INDUCTION of facts, except those of the Phenomena of our Mind: And the overlooking of this partition has been a great cause of error in Philosophy. The restitution of this distinction is indispensable to the existence of Pneumatology.*

The mischiefs of a false phraseology, in misleading the understanding, are a well-known opprobrium in Philosophy. And, while two of the causes of this evil—namely—our biases and our ignorances—are also known; there is a



third, which is very little noticed, it consisting in the employment of *figments*, the use of which has no other apology than a desire of convenience in the saving of circumlocution; and a saving, likewise, of some incumbrance of thinking, which would subject us to carry two collateral trains of objects in our mind at the same time,—a burden altogether necessary to be carried in the investigations of Pneumatology, but which may be thrown aside in those of Physical Experiments.

The name of INDUCTION has been given to the evidence we have for all the facts in the circle of physical sciences. And the word—"INDUCTION"—is regarded as a device painted on the banner to which the Experimental Philosopher triumphantly points, as the ensign of his conquests over our ignorance of the laws of nature. The Reideian Philosopher, smitten by the sight of those conquests, contrasted with disasters in his own Science, enjoins his followers to an exclusive cultivation of the Inductive Method: While he laments, and continually urges, the evil of our being *immersed in the perception of the qualities of a substance foreign both in locality and essence* to those of Mind; and ANOTHER EVIL, STILL GREATER,—namely—that of our imagining to ourselves ANALOGIES *of those external qualities, and imputing these analogies to the phenomena of our Mind*. How, then, will a reader be surprised,—(and the less he is in the subject the more he will be surprised,)—to be told that nearly the whole of this view is *a mass of most certain illusion*,—that the *very reverse* of it is the truth,—and that there is not a more indisputable position than that this illusion must be expelled from the subject, before we can attain a logic fitted to the advance of pneumatological science. A brief account of the origin of the Phraseology in question may greatly tend to facilitate its removal.

It is evident from the quotation of Sir Isaac Newton's query, given in the title-page of this Supplement, that the most illustrious followers of the so-called Inductive Method, inasmuch as they confidently believed in the exist-



ence of a *Sensorium*, and in our *perceiving through the medium of Species*, could never have believed that we have an **INDUCTIVE** knowledge of *any external fact*. They nevertheless applied the name of induction to their **ANALOGICAL INFERENCES** of external facts, because they had a *real induction of the Sensations on which those inferences were bottomed*, and this phraseology saved any expression, and any *thinking*, of our mental operations in the conduct of the physical processes. In so doing, Newton and his associates never thought that any mischief could arise from the use of the misnomer; inso-much that, although he expressly explains in his *Optics*, that we *never perceive light*, but perceive *only our own Sensations of Color*, he nevertheless exclaims, upon his opponents, that he *does not feign hypotheses*;—an assertion which, in strictness, he must have known was not true; but which was *true in construction*, because all he meant (and he knew he was well understood) was, that he did *not frame hypotheses out of his IMAGINATION*, but advanced those only which, as I have said, were *bottomed upon his ACTUAL SENSATIONS*.

If this account of Induction, and of Newton's estimate of it, cannot be contraverted; then, What becomes of the pretence that we are immersed in a perception of the qualities of *external things*; and frame to ourselves *analogies of those external qualities*, in order to describe and liken *our own modifications*?

But the mischief which Newton never anticipated has come to pass. In other words, it has, since his time, been started, and erected into a great scheme of philosophy, that we argue **FROM** external qualities, (of which it is certain we never have any induction;) and **TO** our own modifications, of which alone we have an induction. And the aim, in thus reversing the most certain of any facts *in the order and superiority* of our knowledge, is to assume that *mental qualities have nothing in common with external qualities*, i. e. that the *Percipient Subject* has no quality in common



with the *External Subject which is admitted to be the physical cause* of the perception.

It is evident, on this statement, that the admitting of the misnomer ("INDUCTION") to express the ANALOGICAL INFERENCES of the mind, has operated most mischievously, in holding up to all Natural Philosophers, as well as to ordinary readers, *that the facts of which we have an induction are the facts of the external world*: which is precisely the doctrine of the innovating philosophy; the upshot of whose assumption is that we *perceive the things of the external world themselves immediately*, in the same sense as the vulgar think we do. And, although a large proportion of Natural Philosophers are not drawn into this deception; they turn with indifference from such confusion, and confine their interest to their own department: While all general, or mere literary readers, are led to imbibe the fallacy in question, from its accordance with the *admitted phraseology concerning induction*.

Had Newton been living at the time, however, he could not have prevented either the advent or the diffusion of the Reideian Philosophy. He had no evidence of Phenomena, that could withstand the seductions of a sublime chimera with regard to the nature of our sensations. And all that he could have done was to turn, as his brethren now do, in despair from the subject; thus increasing the evil, by leaving it a derelict in philosophy, and a mere *springe* for the snaring of superficial readers. In other words; it would have been unavailing in the whole Newtonian phalanx to insist, *from deduction*, that Vision, or Perception, *must be* of things in the Mind; so long as they had discovered *no means of demonstrating*, INDUCTIVELY, *that the things perceived ACTUALLY ARE there*.

This brings us to the *application* of the foregoing statement, to its bearing upon the *competency* of our Sensations of Color, especially those occasioned by Pressure, to serve as evidences for determining the Figure of the Sentient Subject. In the first place therefore, I observe, No com-



petent advocate of the Reideian Philosophy will ever place himself in the situation of affirming that the Figured Phenomena called Peacock's Feathers are *external* things. Neither will he affirm that we SEE THE PRESSURES *which occasion* them. But, if this be above all controversy; it must hold equally, that, not only these Figured Phenomena *themselves*, but also *their local bearings,—their distances between each other,—and all their local mutations, and phases,—must be in the Sentient, where the Phenomena themselves are.* It follows, without a question, that whatever is determined concerning the Figure of the Sentient by the phenomena and mutations of Peacock's Feathers, is determined *INDUCTIVELY in the only true import of that term*, and stands *above* every other class of proofs, of any fact whatever.

As a special example of this; I now observe that, all the *facts of Optics and Astronomy*, being *no higher than INFERENTIAL*, are *not only inferior in their evidence* in support of these facts; but, along with this, *THEY HANG FOR THEIR SUPPORT UPON precisely the same evidence*, specifically taken, as that of the Peacock's Feathers. Thus, when an Astronomer affirms the fact of *the place,—the bearing,—the contact,—or the motions,—*of any one, or more, of the heavenly bodies; his sole evidence, in support of this assertion, is *the place,—the bearing,—the contact,—or the motions,—*of one, or more *Patches of Sensations of Color*; which masses of Sensation he *calls Jupiter, or Saturn, or their Satellites*, or some such name of an *External Body*; though, all the while, if he be a true Newtonian, he knows those objects are nothing but modifications of his own mind. Impeach, but for a moment, the certainty of the relative magnitudes,—distances,—contacts, and—mutations,—of the patches of sensation in question; and we annihilate all the facts of astronomy, without leaving a vestige of reason behind to support them. In Optics, the very same annihilation would take place, of the asserted *proportions* of



of various colors in a *so-called* "Spectrum of the Sun;"—and in the radiation, the refraction, and reflection of light. In a word; the competency of the Phenomena herein called Peacock's Feathers, for the present purpose, cannot be so much as impinged upon by a doubt, unless we would render all natural science no better than a romance.

The Sensations now in question—may, certainly, in some of their Phases, furnish us only with dubious inferences, upon certain points in determining the Figure of the Sentient; just as Sensations, which we in Astronomical phraseology fallaciously call *Phenomena of the Moon's Surface, or of Saturn's Ring*, may leave something to be desired in our conclusions regarding those external and unperceived bodies. But, *in so far as the former are conclusive*, I repeat, they do not brook a hesitation, or a doubt, that would not involve the whole of Natural Philosophy.

Owing to the accident of Newton's mind having, by some means, been called off from tracing Vision into the Head by the phenomena in question, (an accident most unfortunate for the past fate of Pneumatology,) Dr. Reid was left at liberty to hold up with systematic ridicule the belief that, during vision, Color Objects exist "*in the dark chamber of the brain*;"—a procedure on his part which proves how little he anticipated that his Philosophy could ever be assailed on *this* side;—and a procedure, too, which has been received with such influence and consequences by that proportion of pneumatological readers of the last age who have embraced, as being equally true and sublime, every position that is part, or parcel, of the doctrine of *nonresemblance* and *nonlocality*. What, then, would Dr. Reid now say, were he alive: Or, Would he *still make a stand and DENY* that the so-called Sun and Moon, and all the so-called Bodies of the Solar System, which we ever perceive, *i. e. of whose existence we ever have any* **INDUCTIVE** knowledge, *are Objects which appear, and revolve, and change their bearings, IN THE BRAIN,—I hardly need say, IN THE MIND in the brain?*



In fine. A more striking example could not be required, of the confounding, *not only in name, but in effect also*, of INDUCTIVE knowledge with that which is *only analogically* INFERENCE; (while none could place the Reideian Scheme of the *inextension of our sensations of colors* in a more chimerical light;) than the fact that, no less a writer than DR. REID *so totally confounded, and identified*, COLOR—a *mental affection*,—with LIGHT—an *external agent*,—that, it is plain from his procedure, he would as readily have anticipated that *two* might be proved to be *six*, as that *Color Objects can exist where Light is not*.

But if the proved existence of Cerebral Vision has rendered the real pretension of the Reideian Philosophy as irresistibly manifest, as I apprehend it now is; What, then, have the Continental Writers left to cling to, in the Reideian Scheme: Or, What becomes of *all the sweeping and supposed-sublime condemnations* of physical analogies concerning the nature of Thought, and of Mind? When the foundation is thus gone; What can longer render the superstructure tenable, in any of its assumptions?—"And  
 " *these things being rightly despatched, Does it not appear*  
 " *from the phenomena that there is a Being, incorporeal,*  
 " *living, intelligent, omnipresent, who, in infinite space as*  
 " *it were in his sensory, sees the things themselves, inti-*  
 " *mately and thoroughly perceives them, of which things*  
 " *THE IMAGES ONLY, carried through the organs of*  
 " *sense into our little sensoriums, are there seen and be-*  
 " *held by that which in us perceives and thinks?"*

The great INDUCTIVE conclusion, which flows legitimately from all that is said above, is this:—MIND is a SUBJECT, of which FIGURED COLOR OBJECTS are AFFECTIONS.—And the great INFERENCE conclusion, which flows from this, is that the proposition is CONVERTIBLE, (although I do not take room here to illustrate it,) namely—WHATEVER SUBJECT supports the affection called FIGURE, is MIND. According to the Newtonian rule for the assigning of causes, there is not a conclusion



in Natural Philosophy that stands higher, in legitimate filiation, than this one. And it is because the Reideian Philosophy, in addition to its amount of fallacy, plays in effect into the hand of Atheism, by upholding the belief in Matter, that I have unceasingly, as far as circumstances would permit, labored, step by step, in evolving the successive stages of proofs of the *Mentality of all Extended Substance*, beginning with my early speculations on the subject, and ending—(as I suppose it will end so far as my labor is concerned)—with the present investigation of the Sensorium, through those figured mental affections which form the immediate objects of scrutiny in this supplement.

It may not be superfluous to observe, for the sake of readers of a certain depth, that this course and result are not to be confounded with the Cosmogony of Bishop Berkeley; from which, they are as foreign on the one hand, as they are congenial with that of Newton on the other.

### PROPOSITION III.

*Phenomena which determine that the Transverse Vertical Figure or Equator of the Sensorium, in Man, is either Circular or Elliptical.*

It was known all along, from Anatomy, that the figure of the cranial eye approaches that of a concave sphere,—a form which enables it to receive impressions of light conveyed through the minute aperture of the pupil, and to diffuse them, *crossed over* upon the retina, in an inverted order from that of the correlated points of the external objects which reflect the rays. And it has been shown, throughout the previous stages of Cerebral Vision, that the retinal impressions, just mentioned, are *afterwards* RECROSSED, somewhere posterior to the eyes; and that, thus we see objects erect, owing to a *rectification* of the



inverted retinal impressions, in their way *backward*, before their discharge in some unknown manner upon the perceiving mind.

These considerations, and that of the phenomena which present themselves on our first and most limited attempts to investigate the subject by means of pressure, strongly indicate the probability that there is an analogy, and this a very close one, between the Figure of the cranial eye and that of the Sensorium. And the whole appearance, thus far, goes to shape conjecture for the course of investigation which has been followed.

It is farther to be premised, from the whole tenor of experiments on the subject; (although some deviation in this respect, *as to height*, may exist without affecting the investigation;) that the Sensorial Region appears to be situated *nearly in a horizontal* direction behind the cranial eyes; and, *as mediately between* the two as that posterior situation will admit. Perhaps, for the purpose of illustration, we may suppose the Sensorium to form *nearly an equilateral triangle* with the two eyes, as represented in the Plate;—any greater posterior distance of the Sensorium, which may in reality exist, making no difference to the results.

It is another preliminary point, settled upon the most indubitable induction, that the Sensorial Region is in its *main bulk* COMMON to impressions from both the eyes: Although, it is equally certain that it extends *LATERALLY*, on each side, in a *wing, or process*, liable *exclusively* to impressions coming from that eye which is on its own side; the nervous mechanism not being able to *reach across laterally*, so far as to impress the extreme of the opposite side.

Taken in its *VERTICAL* extent, the Sensorium is *wholly and strictly* common to impressions from both eyes.

The objects for consideration, in this Supplement, being those Masses of Sensations of Colors called Peacock's Feathers, or other Phenomena of the same Tribe; it happens,



from the same sort of deception by which we refer any of our Sensations of Touch to that part of the body at which the nerves terminate outwards, that, to the Experimenter, the Feathers *appear to be in the EYE*; and, sometimes, as if *thrust out beyond the eye and nose, into the air*. In every instance of experiment, therefore, we are to remember to correct this deception by an act of our judgment; by which, we must *transpose* the Feather to the *Sensorium*: And, in so doing, it is vital to a true apprehension of the subject that we must *always place the phenomenon on the opposite side of the Sensory, (whether it be right, left, front, or back,)* to that side of the eye on which the pressure is made.

With this much of description, we may now lay down a diagram of the different lines, and positions, on which it is requisite that pressures should be made; or, at least, on which I have experimented, as described in the following details. And, for the sake of distinctness, I shall here employ the nomination of *two great circles on the eye*;—and likewise of *two great circles, analogously, on the Sensorium*: One of which may be called the *Equator*; it being, in the case of the eye, that *Transverse Vertical* Boundary Line which has the Pupil and the Back of the Eye for its Poles: And the other, which also passes through the Poles of the eye, may be termed the *Horizontal*; it being that which is in the same plane with the external horizon, when we are standing upright and looking round us on the general field of external objects. These, and the two analogous great circles on the Sensorium, will be sufficiently understood from this description and a reference to the PLATE. It is evident that the two circles in question, in each case, being one at right angles with the other, involve the whole gross Solid Figure of the Sensorium in the one case, as it does that of the Eye in the other. Accordingly, a course of pressures upon these great circles on the eye must form our *principal* course of experiments: While a similar procedure on *lesser* circles, or on *arcs* of lesser



circles, as well as on a variety of other points, will make our *secondary* course.

It only remains to explain, that the word—*Sensorium* or *Sensory*—is employed here instead of the term *Sentient Subject* or *Sentient*, when no mistake can arise from this use of terms. The *Sentient Subject*, moreover, is the *Percipient Subject*: But, as it forms a most important consideration in the present inquiry, in confirmation of the results of my former speculations on this subject, that the *Mind estimates objects from a COMMON CENTRE OF PERCIPIENCE within itself*; from which *common point, all Companies or Pluralities of Local Relations or Bearings of Sensations of Colors are perceived or adjudged*; this consideration renders it requisite that a percipience of a *SINGLE mass, or point, of Sensation of Color*, and a percipience of the *several local bearings of ANY PLURALITY of sensations of colors*, demand a due distinction in the phraseology employed in treating of them. *As there is no fact within the mind that is MORE certain; and, no fact in external nature that is SO certain*; as the existence of this Common Centre of Percipience; it must be rigorously held in view, in all our researches on the Subject. I have already pointed out, (in Prop. 2,) that, among other facts, this Principle is the *sole foundation and support of Optical Science and Astronomy*.

These considerations being placed in the reader's view, I proceed to the proposed induction.

### *Experiments and Phenomena.*

1.—If we institute a pressure, with a pin's head, vertically all round the exterior of the globe of the eye, as far back as the parts will conveniently admit; this process will impress a *Transverse Vertical Circle*, about half way between the pupil and the Posterior Pole of the eye, or, in other words, it will delineate that great circle of the eye which I have called its *Equator*.



Here, by the way, we are to note that, none of the circles, or lines, or bearings, or distances,—in short, *none of the phases, including therewith the magnitudes*, either of the pressures or of the occasioned *Feathers or Objects*, are spoken of with any thing like *mathematical accuracy*; but only as being *measured by our adjudgment in perception*: While it is certain that, no deviation from accurate truth, in any of these respects, can in the least degree vitiate, or affect, the truth of our conclusions on the subject. As an example of this; I may remark that, for any thing yet known, it may come out in future investigation that the Sensorial region is *not equal, nor near equal*, in magnitude to one of the cranial eyes: in which case, the real magnitudes of, and distances between, the Feathers, will not be equal to those which belong to the *retinal impressions on the eyes*: but, still, the magnitudes, and distances, of the Feathers will *not only be real magnitudes and distances*; but they will *also be, to perception, PROPORTIONAL* to those of the retinal impressions; and, *upon this foot alone rests all our assertions of facts* regarding the motions, or places, of the heavenly bodies; and the magnitudes, or proportions, of the colors or parts of a so-called *Spectrum of the Sun*.—When we assert that a Satellite has appeared, or disappeared, from, or behind, a Planet; we have no other evidence of this fact; *and no other or more exact method of measuring it*; than in, and by, our perception of two visual phenomena or objects which may, in the utmost strictness of classification, be termed *two modifications of the Peacock's Feather*.

Now the result of the pressure, above described, will be that we shall see a *Peacock's Feather*; and see it *travel all round*, that is forming, to our perception, a *Circle*; which, in fact, will be a *Transverse Vertical Circle in our Sentient*. This circle will appear as if it were travelled, by the Feather, in and round the field of the EYE; the Feather invariably maintaining a situation *opposite to the point of pressure*. But it has already been explained that,



we are to correct the deception which places the field of vision in the eye, by translating the Feather to its real field, back in the Sensorium. And we now know that it is somewhere in the course of the travelling of the *impression*, backward toward the Sensorium, that it is RE-CROSSED OVER, and is thus deposited on the *opposite side of the Sensorium*, to that side of the eye that is impressed.

2. If, instead of *one* pressure, or pin's head, we now employ *two*—namely—one upon each side of the same eye; the same sort of result will be seen, that is to say we shall see *two* Feathers, each of them travelling in a circle round the Sensorial Region, and each maintaining its position opposite to that impression on the eye which occasions it.

3. If, in the next place, we press round the eye in any *lesser circle*, parallel to the eye's Equator, and between its Equator and its *Posterior Pole*; we shall see a Feather travel in a circle as before; but in a *lesser circle*, it being always in proportion to the size of the circle impressed. In conducting this experiment, we cannot accomplish a *complete circle* much farther back than the Equator of the eye: but we can effect this in *detached curves* to a very considerable approach toward the Pole, insomuch as to leave not a doubt that a pressure upon its Pole would occasion our seeing the Feather as if it were in the Pupil, that is as if it were an *external* object directly in front of the eye.

From involved considerations, which fall not within the scope of this proposition, I shall postpone an account of correspondent pressures on lesser circles *anterior* to the eye's Equator. But, without any consideration of these, it is conclusively manifest, from the induced phenomena with a single eye, that the *Anterior Half* of the Sensorial Region nearly resembles that of the Cranial Eye in its Figure—namely—that of being nearly *Hemispherical*, unless we could be warranted to conclude, which seems at first sight extremely improbable, and which will be shown



to be contradicted by proof, that the Sentient subject is *merely a flat surface, without depth.*

4. Having put the subject to the test by pressure on a *single eye*; we may next proceed to that of a still higher criterion, by calling *both eyes* into action. With this intent, if we press simultaneously upon the outer angle of each eye; and carry the pressures round the eyes, nearly on their Equators; we shall see *two Peacock's Feathers*, each travelling in a circle, and maintaining its situation in exact opposition to the point of its own pressure. And here, the most remarkable new phenomenon for our consideration is that, instead of the two feathers travelling *throughout in one same circle*, or orbit, as happens when we press on two opposite sides of the Equator of a *single eye*, each of the Feathers, in a great part of its course, exhibits *an exclusive orbit of its own*, but which *intersects*, though it does not throughout coincide with, that of the other. The place to enlarge upon this last consideration is farther on. In this place, it is enough to say that the phenomena, taken together, put us in possession of the fact that the Sensorial Region is, *in gross*, common to impressions from both eyes; but, that it is *extended laterally, on each side*, to a field which cannot be reached by impressions from the farther eye, as shown in the Plate.—It follows, from this experiment, that the Sensorial Region, as far as it is revealed in these results, is not strictly of the figure of the eye, or *spherical*; but is *extended laterally, very considerably more than it is vertically*, and so far appears to be of a *spheroidal* figure.

The disposition of the two eyes which reveals this figure is evidently contrived, or at least is such in fact, as serves for the useful end of *enlarging the horizontal* field of our vision; which, I shall hereafter shew, is far greater than is at all supposed by Optical Writers: While its utility for our information, and preservation, is evidently great; though it does not strike our ordinary notice.



## PROPOSITION IV.

*Phenomena which determine that the Horizontal Figure of the Sensorium is either Circular or Elliptical:—Which result, taken together with that of the Third Proposition, makes the Solid Figure of the Sensorial Region either spherical or spheroidal.*

IT is certain we could not tell, from an act of mere Vision, or Perception, whether the circular motions of the Peacock's Feathers take place upon a *convex*, or a *plane*. And, however improbable it might seem that the Sentient Subject should be a *Plane*, without *Depth*; the impossibility of determining the fact, by the course of experiments described in the Third Proposition, places us under the necessity of resorting to other means of solving the question, in order to place us in greater certainty with regard to it than could be derived from analogical conjecture.

If, with this intention, we now commence, and press round a single eye on *any lesser circle*, *anterior and parallel* to the Eye's Equator; we shall see a Feather travelling round, in a circle that *appears larger* than that which is occasioned by pressing upon the Equator itself. And here we are to recollect that, under the law of the *relative local opposition* of color images to their occasioning pressures, all pressures made on any points *anterior* to the eye's Equator occasion color images in the *Sentient POSTERIOR to its Equator*. As, therefore, the Feather, which appears in the present experiment, exists and travels in a vertical circle in the Sensorial Region *farther back* than its Equator; if this Region be supposed to be spherical on its posterior side, it might at first sight appear, to any one who has never considered the subject, contradictory that a circle upon it, which certainly *must in*



*reality be less than its Equator, should be seen as being greater.* But, upon a moment's reflection, it must be self-evident that this is the very appearance which any such lesser circle must present, to a *Common Centre of Percipience situated in the Interior of a Spherical Sentient.* We are, consequently, here called upon to recognise and contemplate this Sentient Centre of Percipience.

*And First.* It is a self-evident fact in Optics, that the *Eye* is the Common Centre of what is called the percipience of *External Objects*; it being from the eye, considered as a common point, that we judge the *separate direction* of every one of the external objects which occupy our field of vision, at any time; and from which, also, we measure their *angular distances*, and hence *estimate, or guess, the real distance* of these objects from one another. But, by the detection of Recrossed Vision in the Brain, it is reduced to actual proof, (what indeed was always in general *believed*,) that the *Region of Percipience is no more in the EYE*, than the *act itself* of percipience is in the eye, or than the *Color Images perceived* are in that organ. It follows, that the Optical Principle which assumes that the *Eye and External Objects* are its Subject and Objects; and which does so with a sufficient truth of analogy for the purposes of that Science; must here be known for a profound illusion, imposed upon Visive Beings by a most beautiful and beneficial contrivance. And we are, forthwith, to *translate* this illusory and unreal Centre of Percipience, as well as the objects perceived; and are to recognise the real ones as existing in the Sentient, wherein alone they reside. This existence of a Centre of Percipience is a fact placed above all question. And its adaption to the solution of the problem in hand has been manifest throughout.

*Secondly.* Our next consideration, although it is a fact in the mind, bears reference to an *external* fact; which last, I think, has not been adverted to by Optical Writers, but which bears with considerable importance upon the



present subject. By those Optical writers who mention the matter at all, I think, it is not supposed that our *Horizontal* line, or arc, of vision, when we look around us with both eyes, is greater than a *Semicircle*. But it is a fact, which I have ascertained by a great number of trials, that the line, or curve, in question is not less than 240 degrees. Thus, when we look with both eyes directed straight forward, we can see, with each eye at the same time, the flame of a candle, or other objects less luminous, whose direction is *at least thirty degrees behind the eye's Equator*. Here, then, is a lateral field *seemingly* on each side of the EYE, but *in reality on each side of the SENSORIUM*; any thing near the extent of which, so far as I am aware, has never been recognised, or suspected, but the existence of which will explain to us the appearances which we are now trying to account for.

*Thirdly.* While we are called upon to recognise the *benefit* of our being able to see objects, however vaguely, in directions posterior to the Eye's Equators, since this capacity manifestly serves to give us warning of many objects, the proximity, or existence, of which might affect us, and which we could not otherwise be aware of; it is certain we do *not see distinctly*, and consequently do not *particularly attend to*, objects the light from which, through the pupil of the eye, falls upon the retina *anterior* to its Equator. At the same time, we are to remember that all the impressions on the Retina, anterior to its Equator, occasion Images that are *posterior to the Equator of the Sentient*. Now, any pressure on the eye anterior to the Equator, that approaches the pupil *as nearly as the edge of the cornea*, will not occasion a Feather or image at all. And the consequence of this is that, we cannot occasion an image *far enough back* in the Sentient; or, at least, we cannot make such an image *travel sufficiently round in a circle, or curve*, to determine the problem from an *instant inspection* of a circle small enough to afford us a conviction of its relative size. The cause of failure, in this case, seems to be



the *lessening sensibility of the retina*, which diminishes gradually as we advance from the Equator towards the Cornea. And, although we can occasion a *single Feather* as far back as thirty degrees, or considerably more, behind the Equator of the Sentient; we not only cannot make this feather *travel round in that latitude*; but, we can hardly occasion *two Feathers* at the same time, one on each side, by two opposite pressures on the eye, the ready effecting of which last might, I think, settle the question, as will appear from what follows.

In pressing upon the anterior hemisphere of the eye, however, there is another cause of impediment, besides the lessening Sensibility of the retina: And this cause seems to be the *limited sensibility of the whole retina*. The fact, as was before observed, is that it is not for want of *room* on the whole retina, that we cannot occasion more Feathers at a time; but it seems to be that, when the sensibility of that nervous expanse is occupied by three, or four Feathers, (at whatever distances from each other,) the unoccupied parts of the retina are incapable of conveying more impressions to the Sentient—which fact, at the same time, is rather unaccountable, since we can not only readily occasion *two Feathers very near* each other, but we can actually throw the one upon the other, partially, or wholly, at our pleasure. The fact, nevertheless, is certain; and it operates so much more in the case of pressures on the *anterior of the eye*, that, as I have above observed, we can *hardly occasion two feathers, at once*, much behind the Equator of the Sentient. At least it has so happened in my case.

The experiments, here first to be described, are given in the order in which I had employed them,—an order which, it is to be observed, is the most unfavourable for determining the question; but which I adopted as appearing to be the most natural to begin with. I suppose, not only that the issue is as conclusive, as could have arisen from the places and directions of the pressures, when af-



fecting a Spherical Sentient endowed with a Centre of Percipience ; but, also, that the nature both of the Eye and of the Sentient, and that of the Correspondence between the two, are considerably illustrated, in the estimation of the competent reader, by the variety of particulars involved, which, indeed, are much more numerous than I have deemed requisite to describe.

If, thus instructed, we begin to press on the LEFT side of the *right eye, as far back as possible*, which will be very considerably behind the Equator of the eye ; and carry this pressure forward, on the line of the Eye's *Horizontal Great Circle* ; we shall, first, see a Feather, perhaps, twenty, or thirty, degrees apparently on the RIGHT of the eye's anterior pole ; and, as the pressure travels forward, the Feather will *travel to the RIGHT, thus increasingly revealing the lateral extent of the Sentient to the right*, until the pressure has attained the *Equator* of the Eye. This result moreover, confirms what took place in the case of the Third Proposition, wherein we pressed in *lesser Vertical Circles parallel to the Eye's Equator* ; from which process, we determine the circularity, more or less, of the *Equator of the Sentient*.

But if, in the present case, with a view to determine the posterior shape of the *Sentient*, we resume our pressure, and make it travel *still on the horizontal line of the eye forward from the Equator* ; we shall then have *new phases* of the Feather, which will demand our most critical attention. The Feather, in this case, will *still increase its apparent travel to the right* : And therefore, to a first or superficial observer, it would seem that the *Sentient is now revealed in a greater lateral extent to the right*, than it was when we pressed upon the eye's *Equator*. But this last result contradicts the correspondence, or analogy, of the *anterior shape of the eye* ; by which, we found that a smaller circle of pressures upon the eye occasioned a smaller circle of Feathers on the Sentient. And this contradiction, alone, is ground for strong suspicion, that the present ap-



parent increase of the Sentient in a lateral direction may be truly accounted for in another way. Accordingly, after trying very repeatedly, on each side of the eye, an acute observer will, I think, be persuaded that the Feather, though it *appears to travel laterally*, does in *reality travel backward, and not laterally*: While it is certain, as was already observed, that the *appearance of lateral* travelling is that *very appearance which the Feather must have*, from a *Common Centre of Percipience* in the interior of the Sentient.

There is a *peculiar*, though a *very slight* and *perhaps an inconsiderable, dimness* in the aspect of the Feather in this stage of its travelling; which, of itself, must lead any acute observer to suspect that it is not the result of a *real lateral* progress. After innumerable trials, I have found that the phenomenon cannot divest itself of this suspicious appearance: Which, when taken into consideration with the analogy of the sphericity of the whole eye, must, I think, be admitted to form a strong evidence in the matter.

It is proper to add that, more than once, by pressing *far forwards*, on opposite sides of the eye, I obtained a glimpse of two Feathers so *far back in the Sentient*, and so nearly at the same time, as to strengthen my belief in the fact here inferred; although I cannot say that the result was sufficient for a full conviction drawn from the experiment itself. In this case, a younger eye might perhaps have succeeded better. It is also proper to remark that a Feather, as it travels in the way last described, does not invariably become *so much more faint* as might be expected, that is to say provided it had been vivid at first: but it *always alters its phase chiefly by a LESSENING OF ITS DISK, ON ITS OUTER OR POSTERIOR side*; so that, at last, *only half* of it, or *less*, is visible, with its *bow presented forwards*, and, as it should seem, its back part lost, or *rather not formed*, owing to a want of sensibility in the retina near the cornea. Now, the disappearance of the posterior part, before that of the anterior, certainly corre-



sponds, as it ought, with the *anterior point of the pressure's being upon an insensible part of the retina.*

In order to illustrate, by experiment, what has been advanced in the two, or three last paragraphs, as arguments for the Sphericity of the Sentient; If we place a hoop in a horizontal position round our head; and suspend, by a looped ribbon, a round patch of colored paper, on a level with the eye, and three or four inches in diameter, to represent a Peacock's Feather; and, then, make the Feather *travel round, backward, upon the hoop, until we lose sight of it*; this will afford us an exact representation of the *partial, and total, manner in which we lose sight of a Feather occasioned by pressure, without its suffering any great diminution of lustre.* Now, the circularity of the hoop in the one case, affords an evidence of the circularity of the *Posterior region of the Sentient* in the other.

If we could carry the investigation no farther, than the experiments and issue already described; I apprehend, no person could reasonably doubt of the Sphericity of the Sentient, as indicated by what has appeared. But, still, it may be said that, we lack an *experimentum crucis*, in order to afford complete satisfaction on the subject. Fortunately, therefore, for the subject, the thing desired is attainable; as will appear from our proceeding to another, and a final, modification of the course of pressures.

Quitting, then, all pressures upon *Horizontal Circles*, or lines, of the eye; as well as all those upon *Transverse Vertical Circles*; we are now to try experiments on *Fore-and-aft or Meridional Vertical Circles, or Arcs.* And, *first*; If we press above the pupil, nearly on the *Fore-and-aft Vertical Circle or Meridional Arc* of the eye, *as far back as possible*; and make this pressure *travel forward toward the pupil, until it reach near the edge of the cornea*; the consequence of this will be, (as in the case of *all great circles of pressure upon the eye,*) that we shall see a Feather travel *apparently in a straight line*; which straight course of the Feather will be *from under and near*



*the edge of the cornea, backward, until we lose sight of it from the cause already explained. This first experiment, therefore, will prove nothing: Nor is it meant to prove any thing besides the consistency in the result of all pressures on great circles of the eye, which must invariably be that of a straight course of the seen Feather. As, for example, when we press round the Equator of the eye; the occasioned Feather appears to move up, or down, or across, in a STRAIGHT line, for a considerable space of its course; Or, in other words, we do not SEE its course curved; but, on the contrary, we SEE it travel as if it moved along a hoop to which the EQUATOR OF THE EYE IS CONCENTRIC: Whereas, when we press upon ANY LESSER circle, we SEE the course of the Feather curved, continually every instant. The marking of this distinction will prepare us for the experiment that is to follow.*

*Finally.*—If, now, we press in a LESSER Fore-and-aft Vertical Circle; (the best, or first, choice of which may perhaps be about half-way between the pupil and either the inner, or the outer extreme of the globe of the eye; and which lesser circle, therefore, will cut off about a quarter of the diameter of the globe, that is will cut off a segment of about a quarter of the eye, from front to back, as represented in the Plate by each of the circles—G. H.—E. F. one on each side of the pupil of the eye;)—the result of this last experiment will be that, we shall plainly discern a Feather travelling in a Fore-and-aft vertical CIRCULAR course, ALL ROUND the contrary side of the Sensitive, as represented by each of the circles—H. G.—F. E.—We may repeat, and also modify, this experiment, on different magnitudes, and positions, of lesser vertical fore-and-aft circles, or arcs: And, in each variety of the experiment, we shall continually have the most perfect satisfaction, in discovering the correspondent circular course of the Feather ALL ROUND.

The result last described, in every one of its modifications, is at once a conclusive proof of the convexity of both



*the Posterior and the Anterior portions of the Sentient Subject*,—a proof which does not appear to leave the smallest opening for dissent with regard to the Figure of the Sensorial Region, all the way from its Anterior Pole to within (perhaps thirty or forty degrees, on each side) of its Posterior Pole; concerning which last-mentioned Region, alone, we are still in the dark, *in so far as is revealed by VISION.*

### *Of the Sensorial Aberrations of the Eyes.*

An impediment of very repeated recurrence,—that of my inability to afford such continuance of application as would be requisite for farther advancement,—has obliged me to stop here and submit what has been done, as a Second Appendix to the Rationale of Cerebral Vision,—a step which I adopt in order to prevent the chance of its being misprinted in case its publication should be left to another hand. In this notice, of course, I design to convey my acknowledgment, that, while I trust the determination of the Figure of the Sentient is herein effected in *gross*, there still remain various particulars to be perfected, by some more able and more fortunate hand. The principal purpose, therefore, of the following observations, is to hint (for I cannot attempt to treat adequately) some of the particulars now alluded to, in order that a competent future inquirer may avail of it, in throwing light upon those dark points.

FIRST. The most considerable of these remaining difficulties, is the *want of a total coincidence*, (*laterally taken*,) of the impressions from both the cranial eyes, in their respective discharges upon the Sentient: Or, in other words, the difficulty consists in the fact that, the Sensorial Field, *taken in its lateral extent*, is *not wholly common to impressions from both eyes*,—not even when the eyes, and the pressures, are so disposed as to produce the *greatest practicable approximation* to a total coincidence.



The fact of the case—(that is the *greatest approximation which we can effect*)—is this: If we press, *as far back as possible*, on the *horizontal line*, on the *outer angle of the left eye*; and, at the same time, press *as far forward as possible* on the *horizontal line*, on the *inner angle of the RIGHT eye*; the Feather occasioned by the *left eye* will be *thrown partially* (that is *about half* of it) upon the Feather occasioned by the *right eye*.—This partial coincidence, however, is unsatisfactory in two particulars:—It is *not total*:—And it is occasioned by pressures upon *uncorresponding points* of the two eyes, owing to *one pressure's being anterior* to the Equator of one eye, and the *other posterior* to the Equator of the other. Now this result gives rise to two difficulties—namely—*First*,—It contradicts a hitherto unquestioned principle in Optics, that *impressions on corresponding portions* of the two retinae occasion accurately—single vision—with both eyes. And,—*Secondly*,—It would appear that, in the case of pressure on the *horizontal line* of the eye, *near the Equator on its posterior side*, or on *any point anterior* to the Equator, the occasioned Feather, seen on the opposite side in the Sensorium, must *enter into the Wing or Volume of the Sentient*, and *must pass through it*, in a way somewhat analogous to that in which a *film* passes through a volume of water.

The curious fact, here last adverted to, I shall leave, as I have found it; with this only remark, that, if it prove to be in reality as it appears, it seems at least to receive countenance from the Anatomical Structure of that Medullary Mass, near the centre of the brain, which, in all probability, is the ultimate nervous instrument of vision. Thus, if we suppose the spherical mass, involved in and making up the *Annular Protuberance*, to be the ultimate instrument of vision; which, in other words, is supposing that the *Sensorium occupies and nearly fills this mass*; in this case, it is plain, the mass in question *must be pervaded by the Sentient*, in some such way as *space pervades*



*a body which occupies it.* Nor are we, at all, to suppose that this sort of occupancy could *prevent our mental operations*, any more than we find the agency of magnetism, or of gravitation, is prevented by an intervening body.

In this place, however, it is proper to explain, that *SENSATIONS, being neither films, nor substances of any kind, but affections or modifications* of a Substance, NEVER MOVE IN REALITY IN THAT SUBSTANCE, although they *appear* to move. They move, only, in the same unreal sense that a flame, lighted at one end of a straw, moves and runs along the straw; the real fact of which is, that the *same* flame does not travel along any part of the straw; but, what we see is a *new flame*, called into existence every instant, at every successive part that is consumed of the straw. At the same time, this fact does not in the least affect the validity of our conclusions deduced from the *apparent motions* and mutations of Peacock's Feathers; because, *all their respective bearings, and distances, at any one moment, are REAL FACTS*; and this not the less so, though it may perhaps be found that, the *apparent* distances are *not the true* distances, but are *only proportional*. And, as little does it make against the supposition of the Feather's being, *sometimes, within the volume* of the Sentient.

It remains, then, to consider the *non-corresponding of the Visual impressions*, from the two eyes, as above adverted to. And, first, I may venture to believe that, not one person in a hundred actually sees the *same minute object with both eyes*, unless his eyes be guided by *eye-tubes*. And, *not one person in a thousand* KNOWS whether he sees with *two eyes*, or with *one only*. And, even, when the two eyes are *constrained* to a proper direction, by two eye-tubes; it is *only now-and-then* that we can catch a *glimpse at all of any minute object or minimum visible*, with both eyes: At least, such is the fact in my own case; but I acknowledge that one of my eyes is not only dim-sighted, but, in addition to this, the axis of the weak eye



is experimentally out of the due direction, although the eye does not proclaim this in its external appearance.—Here therefore, I think, we are called upon to *examine rigorously the usual opinion* that impressions on the axes of both eyes produce *accurately*-single vision.

In the outset of this last-mentioned consideration ; there can be no question but, when an impression from each eye *falls coincidently upon the Sentient*, they produce *accurately*-single vision. But the question, which we are concerned in, still remains—namely—DO impressions from the AXES of both eyes, or, *from any two points at equal distances, laterally, from the two AXES, fall COINCIDENTLY ON THE SENTIENT* : Or, is it not rather a fact that they fall with *some small aberration* ;—which aberration *increases*, as the distance of the retinal impressions from the AXES of the eyes increase,—a result arising from the *deviation of the direction of the axis of each eye*, from the direction of the axis of the Sentient, the axis of the *right eye* deviating to the *left*, and that of the *left eye* to the *right*, as will be evident from an inspection of the Plate?

But, even if we suppose this last suggestion to be the truth ; it still remains to be explained, by what nervous mechanism a pressure on the outer angle of one (*say the left*) eye throws the Feather seen on the opposite side of the Sentient *less far over on the right*, than the Feather occasioned by pressing on the inner angle of the *right eye* : in consequence of which aberration, it seems to follow that the Feather, in the former case, is *not an affection of the SURFACE MERELY, but enters into the VERY MASS* of the Sentient. That this happens owing to the *disposition of the eyes* ; and, that the disposition, and the situation, of the eyes might lead us to *expect* this result ; and, lastly, that the aberration in question, *especially in its operation on each side of the head*, is a fact *very beneficial to the animal to which the eyes belong* ; are manifest truths : But the *manner in which it is done remains a desideratum*.



—I may, however, remark that, the fact of Sensations of color's entering the mass or volume of the Sentient appears to agree with the analogy of our other sensations ; since, doubtless, they all enter the interior of the mind.

What is left for me now to add on the subject, is only what regards the assumed Optical Principle of *Single Vision from Two Eyes* ; which seems to open a different view of that Principle.

The fact, then, I conceive is that the reputed Optical Principle in question holds true *only in a vague sense* : by which I mean that, when we have single vision from both eyes, if the retinal impressions upon one of the eyes be *accurately upon its Axis or Pole*, that upon the other eye will be *very near its Pole, but will not be accurately or quite at the Pole*.—And here I observe that, if this extent of aberration in reality exists ; I am not aware by what experiment, of looking with both eyes, it can be made to manifest itself.\* And if there be no way of effecting this by any judgment we can form from any degree of inclination of the eyes, or by employing two eye-tubes ; I then presume, it must be granted, upon the fact of the Sensorial Aberrations of the Peacock's Feathers, that we have herein discovered a fact in Optics, which, though it at first appears to involve no consequence, may hereafter prove to be a link of connexion with, and a finger-post to point out, future advances on the subject. With a view to any such consequence, therefore, I here repeat, it seems plain that, if there be *any aberration at all at the*

\* Having, in innumerable instances, contemplated two contrasted colors, one with each eye, thrown upon the *same part* of the Sentient ; I have found it hardly possible to make them *blend perfectly into one color*. In most cases, the two colors *alternate*, being seen *only one at a time*. And, when one is *much brighter* than the other ; the former prevails exclusively. But we may often see both *at once*, each maintaining its own proper tint. Now it is certain that so long as this last fact takes place, the nervous impressions from the two eyes *do not fall accurately upon the same elementary points* of the Sentient ; although the two patches of color occupy, in gross, the same field of the Sentient.



centre; this aberration *must increase from the centre toward the surface* of the Sentient.

Along with this; it is certain that Vision from Pressure has put us in possession of the fact, (which otherwise we never could have known, *even upon a general supposition of the existence of a Sensorium*, as entertained by Sir Isaac Newton, Dr. Porterfield, and other Philosophers,) that the Sensorium is larger in its lateral extent than it is in its vertical: and has, at the same time, possessed us of the MEASURE or PROPORTION of this Difference.—And the investigation of this fact has led to the detection of another, which may perhaps have its own use in Optics,—namely—that we can see *External* Objects many degrees (*perhaps not less than forty, or more*) behind the Equator of the eye: While, also, it may here be remarked that, we can see a Peacock's Feather, from an impression upon the eye, I think, *exactly as far back*, as we can see External Objects from light entering through the pupil.

One observation may here be added, with regard to a question not entered into in this Supplement;—namely—that which concerns the SIZE or MAGNITUDE of the Sensorium; which is this:—Although we cannot suppose the magnitude of the Sensorium to be *greater, or with any probability so great*, as the Figure in the Plate, here given for illustration; it MAY *in reality be, to almost any degree, LESS*: Because it follows, from the Principle of a *Common Centre of Percipience*, that all seen objects, *whatever be their real magnitude, must appear of the same size if they occupy equal visual angles*. At the same time, it is certain that, a *retinal impression*, received from a whole landscape, is *concentrated into the diameter of the optic trunk*. From these two concurrent facts it follows that, a *Sentient not larger than a pea, or a drop of water*, might serve to show us objects of the same apparent size as those which we actually behold; and, that our existing nervous machinery is capable of serving as the instrument of such a minute Sentient. As for the ulterior question,—namely—



MALES.

PATIENTS NOT RESTRAINED  
PATIENTS RESTRAINED

The Patient's No.	The Patient's Age.	Number of times restrained by Day.	Number of times restrained by Night.	Number of Hours under Restraint, in												Totals of Hours.	Case carried on;— or, if discharged from the Books, in what state.
				Jan.*	Feb.*	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.		
49	27	1	...			...	...	...	...	...	8	...	...	...	...	8	See Table, 1830.
65	33	6	4				24	...	...	...	...	...	...	12	84	120	See Table, 1830.
71	39	51	...			32	96	...	...	...	45	24	...	70	336	603	See Table, 1830.
101	unknown	1	...			...	9	...	...	...	...	...	...	...	...	9	Died, November 16, 1830.
109	45	113	80			156	228	72	156	396	180	267	168	180	264	2067	See Table, 1830.
138	52	3	...			...	...	...	...	...	...	...	36	...	...	36	Removed during Treatment, July 23, 1830.
147	59	1	2			24	12	...	...	...	...	...	...	...	...	36	See Table, 1830.
173	32	105	...								6	144	372	360	372	1254	See Table, 1830.
192	52	2	...			...	...	...	...	...	...	3	...	...	12	15	See Table, 1830.
205	40	3	...			...	...	...	...	16	12	...	...	...	...	28	See Table, 1830.
235	39	...	1			...	12	...	...							12	Removed Improved, June 8, 1830.
237	33	50	2											300	324	624	See Table, 1830.
250	51	1	...			...	...	9	...	...	...	...	...	...	...	9	See Table, 1831.
256	59	157	184			356	288	576	720	744	584	524	412	20	...	4224	See Table, 1830.
263	34	5	12			120	72									192	Removed Recovered, April 21, 1830.
271	27	20	20					12	432	24						468	Removed Recovered, July 25, 1830.
272	38	9	7						184	...	...	...	...			184	Removed Recovered, Oct. 5, 1830.
273	60	...	5						60	...	...	...	...			60	Removed Recovered, Oct. 3, 1830.
279	unknown	...	12								132	12	...	...	...	144	Died, May 28, 1830.
280	39	34	56								...	72	270	156	572	1070	See Table, 1830.
281	38	...	10														

Oct. 23, 1830.







Whether, or not, the impressions conveyed along the optic trunk, are *afterwards re-expanded*, and thrown upon a *larger Sentient* than that last above mentioned? We must, for its solution, perhaps turn our eyes to ANATOMISTS.

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### *Conclusion.*

As for what has been done in the present Supplement; the ground which has been gained, has been gained INDUCTIVELY: in other words, from it we KNOW, *in the strict sense of that term*, this revealed portion of our Sentient Subject; and, hence, this knowledge will not brook *any speculative attempt, either directly to DENY it, or, yet, indirectly to set up, or maintain, any scheme concerning the Mind that is incompatible with it*: Although, I duly concede that the Phenomena, though they are unimpeachable in their Phases as Mental Affections, may perhaps be better, or more truly, explained by those who come after.

In a department so peculiarly obnoxious to impediment from prejudices, and biases, of the most unyielding nature; it may be allowable to reflect with proportionate satisfaction upon the result, that, not even the most prejudiced person can deny that a footing has, to a certain extent, been effected in the desert of human ignorance concerning the Physiological Conditions of the Mind. We cannot doubt, but *Time* will do its farther work upon the Subject. Nor must we forget the CONNEXION which, we are warranted in believing, will be found to exist *between this and other sciences*.

Let those, who have allowably thought there was full reason to despair of fixing any point of the Physiology of Mind, now be awakened, fairly to contemplate the existing prospect; and mark how soon the predictions may be



nullified, of those who prescribe the possible limits of our knowledge, and have especially affirmed that the *Problem of the Connexion of Body and Mind should never be solved*. Not two years have elapsed since any man, who should have talked of such a thing as Cerebral Vision, would have been heard, by all, with as unqualified derision as if he had pretended to be a dealer in prophecy.

THE END.