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ANALYSIS

OF

THE FIRST SECTION

OF,

MR BROWN'S OBSERVATIONS

ON

DR DARWIN'S ZOOLOGIA.



IN A LETTER

TO HIS LEARNED AND BELOVED FRIEND,

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By HENRIQUE XAVIER BAETA.

Edinburgh :

PRINTED BY J. PILLANS & SONS, NORTH COLLEGE-STREET.

1800.

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Ne pas penser comme eux, c'est mettre une borne à leur autorité.

Helvetius de L'Homme, sect. 4. cap. 15.

All truth is valuable, and fatirical criticism may be considered as useful when it rectifies error and improves judgement.

Lives of the British Poets, by Samuel Johnson.

To Mr Strutt
as a mark of regard
from the au

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MY DEAR FRIEND,

MINDFUL of the great attention with which you have read DR DARWIN'S ZOONOMIA, I address to you the following pages.

MR BROWN, in the First Section of his Observations, means to overturn the existence of the spirit of animation, or sensorial power.

1mo, BECAUSE the existence of the sensorial power, is, according to him, impossible, p. 1.—3.

2do, BECAUSE, even granting the possibility of its existence, the same phenomena are observable, without the presence of the cause to which they are ascribed, p. 3.—14.

3tio, BECAUSE that cause, viz. the sensorial power, is not followed by those effects which would have ensued if the sensorial power did exist, p. 14.—23.

“THE spirit of animation,” Dr Darwin contends, “is the immediate cause of the contraction of animal fibres; it resides in the brain and nerves, and is
“ liable

“ liable to general or partial diminution or accumu-
 “ lation,” (Zoonomia, vol. I. sect. 4.). The quantity
 expended, in the continual motions of life, is sup-
 plied “ by the secretion or production of it in the
 “ brain and spinal marrow,” Zoonomia, vol. I. sect.
 12. 2. 1. Hence Mr Brown (p. 2.) contends, that
 the original production of sensorial power is im-
 possible :—“ For, in order to call it into existence,
 “ it is necessary that it previously exist in the brain
 “ and spinal marrow, as much as in the glands
 “ which secrete any other fluid : The thing secreted
 “ must exist before the organ which secretes it can
 “ be excited to action.” Mr Brown is aware of an
 objection which may be opposed to his reasoning,
 —That the embryo, when originally secreted,
 may have been complete in its structure, and a
 small quantity of sensorial power may have existed
 in its minute brain :—But to this he answers, “ That
 “ the embryo,” according to Dr Darwin, “ is a
 “ simple filament, without sensorial power, or the
 “ means of producing it,” (p. 2.) This, however,
 is certainly a misstatement of Dr Darwin’s principles,
 on the part of Mr Brown, as is well observed by
 the author of the Observations contained in the
 eighth Number of the Medical and Physical Jour-
 nal :—For Dr Darwin (Zoonomia, vol. I. sect. 39.
 4. 1.) says, “ I conceive the primordium of the em-
 “ bryo, as secreted from the blood of the parent,
 “ to consist of a simple living filament.—“ I sup-
 “ pose this living filament,—of whatever form it may
 “ be,—to be endowed with the capability of being
 “ excited into action by certain kinds of stimulus.”

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This misrepresentation of Mr Brown has been defended, or rather attempted to be so, in the twelfth Number of the Journal before mentioned, both on account of Mr Bown's having considered, in the 435th page of his Observations, the passage of Dr Darwin's Zoonomia referred to, and likewise on account of the conciseness, which proceeded from the desire of avoiding the unpleasantness of repetition : but I would ask the author of this defence, if Mr Brown's having acknowledged the obvious ideas of Dr Darwin, in the page of his Observations just quoted, justifies him from the mistatement he makes use of in the 2d page of his Observations, on which he grounds his arguments against the possibility of the existence of sensorial power? Likewise, if a sophistical conciseness in discussing any philosophical subject is allowable, merely for the purpose of avoiding the unpleasantness of repetition? The same advocate adds, that Mr Brown has shewn, " That the embryo has not the means of producing sensorial power : " But he does not point out any argument in support of this assertion ; nor do I believe that he could alledge any one, deduced from Mr Brown's Observations, capable of maintaining it.

IN p. 3. Mr Brown points out two quotations of the Zoonomia, vol. II. p. 688. and 706. in which Dr Darwin says, that oxygene probably affords the materials for the production of the sensorial power ; and that the perpetual demand for oxygene in respiration, is occasioned by the sensorial power being too subtile to be long confined in any part of the system.

system. From these ideas of Dr Darwin, Mr Brown argues thus: " In the suspended animation of persons apparently drowned, the returning energies of life cannot be accounted for on the principles of the sensorial theory." But to conclude so, it was necessary to prove, 1. That the subtileness of the sensorial power is not influenced at all by that morbid state which constitutes the suspended animation, which phenomenon may take place; and so far the returning energies of life, in the suspended animation, may still be accounted for on the principles of the sensorial theory. 2. Even granting that the sensorial power cannot be influenced at all by that morbid state, to support the truth of what Mr Brown contends for, it was necessary to prove, that (while the *exhalation* or *evaporation* of the sensorial power continues) the materials for the production of it, viz. oxygene, are quite withdrawn; or, in other words, that in the suspended animation of persons apparently drowned, the respiration is completely stopped; which Mr Brown has not proved. Indeed, in persons apparently drowned, the respiration, as far as we can perceive by our senses, seems to be stopped. But may not the respiration, in such cases, go on in a very small degree, although unperceived by our senses? And by this means may not a small quantity of oxygene be supplied, which, attending to the circumstances, may be sufficient to afford the materials for the production of the very small quantity of sensorial power required in such cases? The demand for oxygene,

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in the production of sensorial power, seems to be proportioned to the waste of it in the functions of life. See the ingenious Dr Beddoes's Observations on Calculus, &c. p. 104.—107. In the case alluded to, the waste of the sensorial power is very small, which is manifest from the general torpor in which the system then remains; consequently the demand for oxygen must likewise be very small.

THE same answer is equally applicable to the argument which Mr Brown deduces from the state of those animals which pass the winter in a torpid state, or hybernation:—For I do not find Mr Brown's expression just, (p. 5.) "There is no supply of oxygen to stimulate the brain;" because, to say so, it was necessary to prove beforehand, that in the *animalia Hibernantia* the respiration is absolutely stopped. In the same manner, I do not find the expression in p. 6. just,—"For torpor means nothing, unless it mean the total want of irritability;" because total want of irritability, &c. means death, which is different from torpor;—which last means, that there are yet some remains of life, more or less, according to the degree of torpor; consequently torpor means only less irritability than that which is natural, &c.

THE argument made use of in p. 7. 8. is founded on the supposition, that the torpor of the secreting vessels of the brain, (to which Dr Darwin ascribes the cause of some fevers with arterial debility, Zoonomia,

nomia, vol. II. p. 577.), is such as to prevent completely the secretion of the sensorial power; therefore, "if the secretion of the sensorial power is stopt, while what we termed the exhalation of it continues, in a very short time there will be not the least quantity of sensorial power in the system, and consequently not fever, as Dr Darwin says, but death must always ensue; but this not being the case, it follows, that the sensorial power is not the cause of life."

IN this argument, two points are taken for granted: 1. That the morbid state which causes the fever, does not alter at all what is called the evaporation, or exhalation of the sensorial power. 2. That the torpor of the secreting vessels absolutely prevents the secretion of the sensorial power, which is by no means the case, since torpor of a function does not mean the perfect annihilation of it, but a more languid state than is proper; consequently, the secretion of the sensorial power in the case treated of, may go on, though in a languid state, which, however, may be sufficient for the supply of the small waste which then takes place, &c.

P. 8. MR BROWN says, "Many animals have no brain. As they do not possess the secreting organ, they cannot possess the fluid secreted by that organ, and consequently they must not enjoy any sensorial faculty; but they really do possess all the sensorial faculties; therefore, there is a quality without a substance, or those faculties are independent

“ pendent of the sensorial power.” But because brain has not yet been discovered in many animals, are we entitled to say, There is an extensive class of animals which have no brain? Certainly not. Mr Brown’s argument may therefore be answered in his own words, which are in p. 9. “ If the principles “ of Mr Brown were intuitively just, his mode of “ reasoning might be admitted.”

P. 9. MR BROWN says, “ The brain of plants has “ not been discovered, yet Dr Darwin ascribes to “ them faculties which cannot exist without the “ exertion of the secreting power of that gland. “ After simply stating the phenomena, and tracing “ their analogies to those of animals, he contents “ himself with the following inference: From these, “ we may truly conclude, that they are furnished “ with a common sensorium,” &c. (*Zoonomia*, vol. I. sect. 13. 5.). Any impartial man who admits that irritability, sensibility, &c. are faculties of the sensorium in men, after reading sect. 13. of the *Zoonomia*, vol. I. will not say with Mr Brown, that Dr Darwin, in the section alluded to, contents himself with the following inference:—Because, if I have once seen the cause A to produce the effect B, I think, that wherever I discover the effect B, I have a right to conclude, that there also exists the cause A, though that cause be not discovered by my senses, &c.

But if it shall be argued, that irritability, sensibility, &c. are supposed, and not intuitive qualities of
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the sensorial power in men, I shall ask, What is the agent of which irritability, sensibility, &c. are intuitive qualities? Such an objection may be started up against any agent pointed out, even not excluding the "*One Mind which governs the various parts of our complicated frame,*" (Mr Brown's *Observ.* p. 23.). Nay, this is liable to more objections; because, how can our body, or the various parts of it which are material, be influenced, or influence an immaterial agent? "No two things can influence or affect each other, which have not some property common to both of them," (*Zoonomia*, vol. I. sect. 14. 2.). Again, it may be argued, if no agent can be pointed out, to which irritability, sensibility, &c. may be ascribed as intuitive qualities, the proper method will be, to investigate irritability, sensibility, &c. independent of any further agent; whose investigation, therefore, is rather to be considered as a fault. But, if the love of inquiry ever deserves the name of a fault, to such a fault, in Dr Darwin's *Work*, I shall apply what Voltaire says to Helvetius:—"Vous avez un génie mâle, e votre ouvrage étincelle d'imagination. J'aime micux quelques unes de vos sublimes fautes, que les médiocres beautés dont on nous veut affadir."

Lettre de Voltaire a Helvetius.

DR DARWIN, *Zoonomia*, vol. I. sect. 12. 1. says, "The particles of the muscular fibres approach each other in the contraction of a muscle; and as nothing can act where it does not exist, the approach of the particles can be explained only on
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“ the supposition of an intermediate agent. This
 “ intermediate agent is the spirit of animation, or
 “ sensorial power, &c. which (sect. 14. 2.) can assume
 “ the property of solidity, or disrobe itself of it oc-
 “ casionally; but when it communicates motion to
 “ the fibres, or receives it from them, it must neces-
 “ sarily possess the property of solidity.”

HENCE Mr Brown forms the following ratiocination, by which he wishes to shew, that the supposition of the existence of the sensorial power does not render more explicable the phenomenon of muscular contraction, p. 12. “ If,” says Mr Brown, “ the
 “ sensorial power during exertion be impenetrable,
 “ then, either it is in contact with the particles of
 “ the fibre, or not. If it is, the particles of the fibre
 “ cannot approximate, because there is no vacant
 “ space, and the spirit of animation is not pene-
 “ trable; consequently, contraction cannot take
 “ place. On the other hand, if the spirit of anima-
 “ tion is not in contact, then it is necessary to sup-
 “ pose the existence of another intermediate agent,
 “ as nothing can act where it does not exist.” To
 this reasoning, I answer thus:—The spirit of anima-
 tion is in contact with the particles of the fibre,
 and possesses the property of solidity, in the mo-
 ment in which it communicates motion to the
 fibres, &c. (otherwise it could not communicate
 motion to them, as Dr Darwin well observes);
 but, immediately after communicating motion to
 the fibres, the sensorial power disrobes itself of the
 property of solidity, and consequently the particles
 of

of the fibre approach; therefore contraction takes place.

THE objections which Mr Brown, p. 12.—14. starts against the supposition of the sensorial power assuming the property of solidity, and laying it aside, are of no weight, since Dr Darwin speaks metaphorically.

THUS, to say that the sensorial power disrobes itself of the property of solidity, may be understood to be, to leave that space betwixt the particles of the fibre immediately after it communicates motion to them; which phenomenon may take place (if I may use the expression) by the exhalation or evaporation of the spirit of animation, immediately after its communicating motion to the particles of the fibre. This is countenanced by what Dr Darwin says, *Zoonomia*, vol. II. p. 688. and 706.

THEREFORE, the phenomenon of muscular contraction may be thus explained: 'The sensorial power possessing the property of solidity, viz. residing betwixt the particle of the fibres, and in contact with them, being excited into action, communicates it to the fibre, and, immediately after, it disrobes itself of the property of solidity, viz. evaporates, or exhales, or leaves the space betwixt the particles of the fibre, consequently they may approach each other, which taking place constitutes contraction.'

FROM p. 14. to 16. Mr Brown means to shew the
impossibility

impossibility of sensorial derivation ; and from this he proves, 1. The impossibility of the action of distant fibres ; 2. That the brain cannot long continue animated. Which phenomena, however, as they do not take place, it follows, that the supposed cause does not produce the effects which it ought to do.

To prove the impossibility of the sensorial derivation, Mr Brown says, p. 15. " It cannot take its rise from irritation ; for irritation terminates in the contraction of fibres, and no stimulus is applied, &c. ; nor from sensation, for this implies previous irritation," &c. But I will quote a passage of Dr Darwin's *Zoonomia*, from which I shall deduce the possibility of sensorial derivation.

DR DARWIN, in *Zoonomia*, vol. I. sect. 39. 4. says, .
 " I conceive the primordium or rudiment of the embryo,—to consist of a simple living filament.—
 " I suppose this living filament, of whatever form it may be, to be endued with the capability of being excited into action by certain kinds of stimulus ;
 " by the stimulus of the surrounding fluid," &c.
 From this passage, we see that the sensorial power exists, *ab initio*, in every part of the embryo, and that, by this means, it is capable of being excited into action, by the stimulus of the surrounding fluid, at the first moment of existence. Thus, in the first exertion of the embryo, occasioned by the surrounding fluid, that part which constitutes the brain, secretes new sensorial power, and in all other parts of it, that small portion of the sensorial power, which they had received

ceived from the parent at the first moment of existence, is wasted, while the exertion or irritation of those parts take place. Consequently this irritation may be considered as the cause of sensorial derivation; hence is overturned the assertion of Mr Brown, p. 15. "It cannot take its rise from irritation, for irritation terminates in the contraction of fibres, and no stimulus is applied," &c. The consequences, therefore, which would have followed Mr Brown's assertion, are also overturned, viz. "1. The impossibility of the action of distant fibres; 2. That the brain could not long continue animated."

In p. 17. says Mr Brown, "If sensorial power possesses a tendency to equilibrium, the partial accumulation or diminution of it by exertion or repose, is impossible. But partial accumulations being observed, as in the dazzling of the eyes at a sudden exposure to light, after having resided long in the dark, &c. consequently there is not one effect which should have ensued from the supposed cause."

THE idea, that the living principle (whether it be called sensorial power, according to Dr Darwin, or excitability, according to Dr Brown) possesses a tendency to equilibrium, is exposed by Dr Brown, in his Elements of Medicine, art. 48. and chiefly in the note (*l*) to art. 232; but Dr Brown himself agrees, that there are some alterations according to the circumstances. Thus he says, in note (*l*) to art. 232. "Though some parts, differently upon different occasions,

“caſions, may be more acted upon than any other, equal in ſize and nervous importance.”

THIS accounts for the partial accumulation or diminution of the ſenſorial power, even granting its tendency to equilibrium, which therefore muſt only take place under certain circumſtances, viz. when every part of the ſyſtem is proportionally acted upon by the ſame cauſes in the ſame degrees, &c. otherwiſe the equilibrium will be interrupted, and conſequently partial accumulation or diminution of that living principle will enſue.

IN p. 21. after obſerving that certain powers are inherent in life, Mr Brown adds, “If they depended on the figure and quantity of the ſpirit of animation in the ſenſorium, they would then ceaſe to be obſerved, when the figure and quantity vary :— but the figure varies with the quantity, and the quantity varies with every application of ſtimulus ; yet ſenſorial motions do not ceaſe to be excited ; therefore there is not one effect which ſhould have ariſen from the ſuppoſed cauſe.”

WHEN we ſuppoſe thoſe certain powers to depend on the quantity and figure of the ſpirit of animation, &c. and when the figure and quantity of that ſpirit vary, we have no right to conclude that thoſe powers muſt ceaſe, but only that they muſt vary ; becauſe, in order to conclude that theſe powers ought to ceaſe, it would be neceſſary that that ſpirit ſhould ceaſe likewiſe. Therefore we obſerve the ſenſorial motions going

ing on still, though different from what they were before, which is to be ascribed to whatever variation may have happened in that spirit.

FROM these remarks, I conclude against Mr Brown,

1^{mo}, THAT the existence of the sensorial power in the system is not impossible.

2^{do}, THAT those phenomena quoted by Mr Brown, which are observable, are still dependent on that cause to which Dr Darwin ascribes them, since that cause is not absent, as Mr Brown meant to prove.

3^{tio}, THAT we cannot expect, from the supposed cause, those effects which Mr Brown thinks would have necessarily ensued. These effects, therefore, are not observable.

IF these conclusions are right, I have shewn, that Mr Brown has contended with, but not shaken, the ideas of the Philosopher of Derby, whose works future ages will admire and respect, whose merit will always oblige the candid reader to offer him a tribute of gratitude, equal, if not superior, to that which Montesquieu made use of to Helvetius.—“ Mon cher Helvetius, je ne fais point si vous êtes autant au dessus des autres que je le sens, mais je sens que vous êtes au-dessus des autres.”—*Lettre du President de Montesquieu a Helvetius.*

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