

On the pupil in emotional states / by Samuel Wilks.

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Publication/Creation

[London] : [publisher not identified], 1883.

Persistent URL

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B R A I N .

APRIL, 1883.

Original Articles.

ON THE PUPIL IN EMOTIONAL STATES.

BY SAMUEL WILKS, F.R.S.

THERE is probably no structure of the body so mobile or so susceptible of great changes as the iris. The pupil of the eye, by the size of which these changes are perceived, is ever enlarging or diminishing under influences of the most varied kinds. These pertain in health to the impingement of light on the retina, and to the accommodation of the eyes to focal distances; in disease to numberless affections of the brain, spinal cord, and sympathetic system, and even to the more subtle changes which take place in the nervous system from the circulation of poisons in the blood. The pupils, too, may often be observed to react to stimuli applied to the face and neck. All these numberless causes acting on the eye are well known, but I now wish to draw attention to the changes of the iris under purely mental or emotional states.

I have on several occasions whilst sitting at the bedside of patients observed a quietude come over them in which they have assumed a fixed gaze; at the same time the pupils of the eyes have become dilated, and on the patient being suddenly aroused have as quickly contracted. These patients have fallen into the state known as hypnotism, which is identical apparently with that of somnambulism. The latter is not true sleep, where all the senses are for the time dead, for the somnambulist

can walk in dangerous places without falling, showing that the eyes are still impressionable and capable of guiding the body. When therefore Lady Macbeth rises from her bed, walks out with a taper in her hand, and the doctor says, "She is fast asleep although her eyes are open," the gentlewoman is wrong in exclaiming "Ay, but their sense is shut."

I think there is every reason to believe that when the mind is in a passive state, or in any grade of that condition which might culminate in hypnotism or trance, the pupil dilates and the eyes look into space; thus in any pensive, dreamy or pleasurable mood the pupil dilates. When Poe exclaimed in poetical phrenzy:—

"I cannot write—I cannot speak or think—
Alas! I cannot feel, for 'tis not feeling,
This standing motionless upon the golden
Threshold of the wide-open gate of dreams,
Gazing entranced adown the gorgeous vista,"

the poet might be pictured as literally standing gazing with "wide-open pupil."

In mental activity, on the contrary, in concentration of the mind on any object, or in the violent passions of terror or rage, the eye would be fixed on something near, and the pupils would be contracted. Whether there be such a fixed law in the lower animals I cannot say, but in my parrot it certainly obtains. The iris of the bird is ever oscillating, and its variations correspond to its different moods. When frightened, and most markedly when angry, the pupil contracts; when in an amiable frame of mind, the pupil widely dilates. The pupil is an accurate gauge of its mental state.

Poets and painters have in all times regarded the eye as an exponent of the state of mind, or rather of the passions of the soul, but they have never (so far as I know) with one exception attempted to analyse the reasons for this. Shakspeare in numberless passages speaks of the various expressions of the eye, as, for example, in those lines which are ready at hand, "the eye discourses, I will answer it," in 'Romeo and Juliet,' or "an eye like Mars to threaten and command," in 'Hamlet.' Tennyson speaks of good, kind, and pure eyes. Byron was always eloquent over woman's eyes, as in the stanza on the eve

of the battle of Waterloo: "Soft eyes looked love to eyes which spoke again." The only allusion to the form of the eye as indicative of expression is the recognition of a wide or large eye in connection with modesty, affection, and simple love, in distinction from the small, hollow or retracted eye. As just now said, when the eye accommodates itself for the vision of near objects the pupils contract, whilst in looking at a distance the pupils dilate. Now in these different circumstances the mental state is different; in the one case the mind is engaged on some concrete object immediately in view, whilst in gazing into space the mind is in a more abstract mood. It may be that it is this want of near concentration of the eyes, and the consequent distant gaze which he assumes, which contributes to our idea of the majesty of the lion. This is well portrayed in Landseer's lions in Trafalgar Square. I might suggest that if the origin of the word "belladonna" is due to the plant producing an expansion of the iris, it is obvious that a dilated pupil is considered a sign of beauty, and this assuredly would be associated with a kindly and sympathetic state of the heart rather than with an active and powerful intellect.

Lavater speaks much of the expression of the eye, but attempts no analysis. He quotes Winkelman to show that the eye is made to vary much in shape and size in the antique statues, and he also quotes Buffon in the following passage. "The images of our secret agitations are particularly painted in the eyes. The eye pertains more to the soul than any other organ; seems affected by and to participate in all its emotions; expresses sensations the most lively, passions the most tumultuous, feelings the most delightful, and sentiments the most delicate. It explains them in all their force, in all their purity, as they take birth; and transmits them by traits so rapid as to infuse into other minds the fire, the activity, the very image with which they themselves are inspired. The eye at once receives and reflects the intelligence of thought and the warmth of sensibility; it is the sense of the mind, the tongue of the understanding." If this be true, the eye stands pre-eminently above all the other organs of sense; it is not merely a recipient to carry to the brain images of the outward world, but it is again the exponent of the operations of

the mind within. May not this afford a clue to the meaning of its complex mechanism? If, as Buffon says, it is the "sense of the mind," it is surely something more than a camera obscura.

The only author with whom I am acquainted who has actually remarked the condition of the pupil in emotions of the mind is Balzac, and his observations accord with what I have previously enumerated, and with the anatomical facts observed in my parrot. My knowledge of the writings of Balzac is but limited, but I heartily agree with the common judgment that few authors show so great an insight into character, and especially physiognomy, as this great novelist. I will quote from a book at hand, "*Le Curé du Village*." In this novel he describes his heroine as devoting herself to the Church and works of piety; she was always early at her prayers, and when before the altar her whole visage was transformed. "Véronique was for some moments changed. The pupil of her eyes, endued with a great contractility, appeared then to expand and draw back the blue of the iris until it formed no more than a narrow circle. Then the metamorphosis of the eye, active and lively as that of the eagle, completed the strange alteration of her countenance. Was it a storm of contained passion? Was it a force arising in the depths of the soul, which so enlarged the pupil in full daylight (as it grows large in ordinary life in the shade) and obscured the azure of those celestial eyes?" Véronique was, however, open to human impressions, and her heart was not proof against the attractions of a Government official who came to the village, although she refused his offer of marriage. On leaving her "he kissed her hand with a lively expression of regret, and the bishop remarked the strange movement by which the black of the pupil encroached on the blue of Véronique's eyes, which was reduced to only a slender circle. The eye evidently announced a violent revolution within."

On making enquiries amongst friends, in order to ascertain the accuracy of these statements, I have found that some persons have, without any consideration of the subject, made similar observations for themselves. For example, I have been told that if a gentleman has entered a room where a lady has been

present who has had a *penchant* for him, her eyes have lighted up and her pupils dilated. The lighting up or brightening of the eye is probably due to increased vascularity, and participates in the general suffusion or blushing of the upper part of the body. This is shown by the brightness of the eye in pneumonia and bronchitis.

Balzac speaks of Véronique at church resembling the pictures of the Holy Virgin or adoring saints, and implies that they have the same expression of face which he describes. It would be interesting to know, therefore, in what way the eyes were delineated to produce the ecstatic expression of which he speaks. I have not been able to learn what these early Italian religious painters exactly portrayed, but it is very probable that they, as observant men, were able to produce an expression whose details or meaning they had never analysed. In looking at Rossetti's pictures, now being exhibited, I believe I can see a difference in the way he has portrayed the eyes. The artist must have wished to put into his faces different expressions, or wherefore does the catalogue speak of the pitying eye, &c.? Of course expression is given by prominence of the eye, its direction, and position of the lid (during life by movement), but I think I can perceive in such a picture as the "Blessed Damsel" (the larger one), the "Roman Widow," and more especially in "A Vision of Fiametta," a large full eye, distantly gazing, accompanied by a pupil of good size—

"The blessed damozel looked out
From the gold bar of heaven;
Her eyes were deeper than the depth
Of waters stilled at even."

I refrain from further remarks, lest it might seem that I am writing at the dictates of my fancy, and forgetting that my object is to say no more than the limits of a scientific journal allow. I will therefore leave with the reader the simple statement that, as in somnambulism, ecstasy, catalepsy and allied conditions, the pupil is widely dilated, so is it, although in a less degree, in such mental moods where all the senses are hushed, and serenity, benevolence and the pure passion of love prevail. If this be true, it shows that the eye is not only a passive organ

and one of the gateways of knowledge, but is also a portal through which the working of the brain becomes manifest. I have little doubt that a good deal of physiological knowledge on this interesting subject exists amongst good observers in an unwritten form, and I therefore trust that this short paper may be the means of eliciting some facts from others, in illustration of the Scripture truth, that "the light of the body is the eye."