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**Contributors**

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183 Euston Road  
London NW1 2BE UK  
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E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
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## A CASE OF VIVID AFTER-IMAGES EXPLAINED ON HERING'S THEORY.

BY DAVID FRASER HARRIS, M.D., B.SC.(LOND).

*Lecturer on Physiology in the University of St. Andrews.*

THE phenomena recorded and analysed below were experienced by myself when I was occupied in estimating the principal focal lengths of one or two convex lenses.

While focussing the sun's rays at noon upon a sheet of white paper, and without at the moment thinking of the probable effect on the retina, I stared at the dazzlingly white spot for some time, until roused by noticing that the paper was on the point of being set on fire.

On turning my eyes towards the least well-lighted corner of the white-walled room, I noticed a most pronounced black after-image, which persisted for about thirty seconds. Had this merely faded away and given place to normal colour-vision, there would have been nothing more to be experienced than the familiar sensation of being "blinded" as after gazing at the sun itself; but the black patch was followed by two coloured images of such brilliance and, *pro tem.*, apparently so persistent, that a record of them may be pardoned.

The first was a beautiful rose-pink patch, referable to the part of the retina concerned in direct vision; it lasted about three minutes; it was replaced by a brilliant canary-yellow patch of rather larger size, persisting for about twice as long. Before this last had faded I had to leave the building, and so experienced the very unusual sensation of seeing, almost as through a piece of yellow glass, all objects projected on the central portion of the retina; while at the same time their colours seemed less changed than if yellow glass had really been used.

It seems to me that Hering's theory of colour-vision accounts for the colours of these after-images, and for their order of succession.

The theory virtually involves the following (for light of ordinary intensities):—



(1) That white light katabolises the white-black substance,<sup>1</sup> and the vision of a black object (or darkness) anabolises it; but further, that each coloured ray, *i.e.*, of homogeneous light, katabolises the W.-B. Sb., so that whatever other (chromatic) effects it may have, each *coloured* light gives rise to a certain amount of the sensation of white—to a very different degree for the various rays, yellow doing so most of all—hence, as Foster<sup>2</sup> remarks, “a fully saturated colour . . . according to this view does not exist.”

(2) That katabolism of the red-green substance<sup>3</sup> gives rise to a sensation of red, anabolism of it, of green; that if there is metabolic equilibrium (as under the influence of spectral yellow) there is neither red nor green since opposite tendencies are neutralised, but that if any katabolism predominates over any co-existing anabolism, the sensation will tend towards “orange”; if anabolism predominates, the sensation will tend towards a greenish hue.

(3) Similarly for the yellow-blue substance;<sup>4</sup> katabolism alone gives yellow, anabolism blue, a predominance of the one a yellowish, of the other a bluish hue; while spectral green leaves it in metabolic equilibrium.

Thus the various homogeneous constituents of heterogeneous (white) light are supposed to simultaneously affect the several hypothetical visual substances in such a fashion that the tendencies to katabolism are just balanced by those to anabolism, and hence no *chromatic* sensations result—at least not with diffuse light of ordinary intensity; but it must be somewhat different with sunlight of such unusual brilliance as to temporarily “blind” the retina (produce the black negative after-image).

With such light there are, in fact, present the conditions to ensure, on the whole, a marked excess of katabolism over anabolism, and seeing that in noonday sunlight there is a relative predominance of such rays as are associated with maximal luminosity, *viz.*, the orange-yellow, the first effect in consciousness would be a sensation of white so intense as to render for a time any concomitant chromatic sensations unperceived.

Violent katabolism has been set up in the R.-G. and Y.-B. substances, and will make itself felt in consciousness as soon as the negative after-image of black (resulting from the rapid reconstitution of the W.-B. Sb. on the cessation of the very violent stimulation) has passed away.

<sup>1</sup> W.-B. Sb.

<sup>2</sup> “Text-book of Physiology,” part iv., 6th ed., p. 1349.

<sup>3</sup> R.-G. Sb.

<sup>4</sup> Y.-B. Sb.



The first effect is that of a rose-pink patch from the katabolism of the R.-G. Sb. by the orange rays, virtually a positive after-effect due to retino-cerebral functional inertia. It is pink and not a pure or saturated red because, *ex-hypothesi*, there is always some concomitant katabolism of the W.-B. Sb. along with any effect due to coloured rays. As soon, however, as the metabolic equilibrium of the R.-G. Sb. has been re-established, a yellow patch is perceived due to the predominance of katabolism over anabolism in the Y.-B. Sb. We have experimental evidence<sup>1</sup> that, as studied under appropriate conditions, the sensation of red is elicited in a shorter time than that of green, and still more so than that of violet; in other words, yellow takes a longer time to be developed than red.

Thus, as the red sensation passes off, the yellow is reaching its maximum,<sup>2</sup> the katabolic phase in the Y.-B. Sb. long out-living the period of action of the stimulus which produced the disturbance. The yellow is now the only chromatic sensation not neutralised, and it is perceived in its fulness until, on the metabolic equilibrium being re-established, it, too, fades away, and the retina recovers from its state of over-stimulation.

### Review.

*Neurypnology, or the Rationale of Nervous Sleep, considered in Relation to Animal Magnetism or Mesmerism and Illustrated by Numerous Cases of its Successful Application in the Relief and Cure of Disease.* By JAMES BRAID, M.R.C.S., C.M.W.S., &c. A new edition, edited with an introduction, biographical and bibliographical, embodying the author's later views and further evidence on the subject, by ARTHUR EDWARD WAITE. London, George Redway. 1899.

THE above work comprises (1) a biographical introduction, which gives a short account of Braid's life and a more extended one of his writings; (2) a reproduction of the original edition of "Neurypnology," which forms the greater part of the volume; (3) an appendix of editorial notes chiefly drawn from Braid's later works; and (4) a bibliography of Braid's writings.

According to Mr. Waite, little is known about Braid in this country, and there is no trustworthy bibliography of his writings.

<sup>1</sup> Stewart, *P.R.S.E.*, 1888, p. 441.

<sup>2</sup> It has a slightly greater degree of functional inertia.



His later works, rare and almost unknown, have been traced with difficulty. Mr. Waite, however, claims to have been successful in his researches, and presents, as their result, a work on Braid which he asserts to be substantially complete.

Mr. Waite has undoubtedly rendered a service to hypnotic literature, but he has not made the most of the material collected, and his work is neither as complete nor as accurate as he believes it to be. The following are a few, amongst many, objections which might be urged against it: Thus, we are told that the discovery of hypnotism alone lifted Braid out of the groove of the ordinary practitioner. This is incorrect. Before he discovered hypnotism Braid had operated on 262 cases of talipes, 700 cases of strabismus, and twenty-three cases of spinal curvature, and his reputation as a surgeon attracted patients from all parts of the country.

Although "Neurypnology" is historically interesting, it must not be forgotten that it was written almost immediately after Braid commenced hypnotic work, and that later his views underwent a complete change. The French translation of "Neurypnology" is more valuable than Mr. Waite's, as in an appendix of thirty-six pages it gives a full translation of Braid's last manuscript, containing a summary of his more matured theories. This is barely referred to by Mr. Waite.

Some passages show a somewhat unusual want of care in compilation. Thus (pages 317-319), a case of torticollis cured by suggestion is recorded at length, and we are told that a year later there had been no relapse. The case is repeated (pages 343, 344) along with the fresh statement that "whether the cure was permanent does not appear from the narrative."

The bibliography, to which Mr. Waite attaches great importance, only imperfectly reproduces those I myself published at earlier dates (BRAIN, part lxxiii., Spring, 1896; *Proceedings of the Society for Psychical Research*, part xxx., June, 1896; *Revue de l'Hypnotisme*, June, 1898). In seven of the works referred to by Mr. Waite the title is wrong or incomplete; in twenty-one, quoted from medical journals, neither volume nor page is given. The only new material is two unimportant letters in reply to one from "James Simpson, Esq., advocate," erroneously described by Mr. Waite as "James Singer," while in my bibliographies are to be found nine of Braid's writings which are omitted from Mr. Waite's. Further, some of Braid's works, of which Mr. Waite has been unable to trace a single copy, have long been in my possession.

According to Mr. Waite, Braid's connection with the debated subject of phrenology terminated with the phreno-hypnotic experiments recorded in "Neurypnology." The subject, we are told, remains where he left it, while Dr. Foveau de Courmelle's verdict, viz., that the phenomena are as likely to be the result of real action as of unconscious suggestion, is accepted by the unprejudiced. Mr. Waite is ignorant of, or ignores, Braid's later



experiments. From these Braid concluded that all phrenological phenomena were the result of direct or indirect suggestion, and arose either from a previous knowledge of phrenology or from a system of training during hypnosis. They manifested themselves when points were touched, which audible suggestion had taught the subjects to associate with particular ideas. Further, pressure upon the head was not necessary, and the associations could be established in the same artificial way between the phenomena and other parts of the body. Finally, the excitation of the muscles of expression was capable of arousing corresponding ideas in the subject's mind.

It is certainly surprising to be told at the present day that the phenomena of phrenology are as likely as not to be genuine.

Mr. Waite's account of Braid's views on mesmerism or animal magnetism demand serious notice. Formerly, according to him, it was generally but erroneously believed that Braid opposed animal magnetism. Thanks, however, to French writers this error has been rectified. Braid was the champion and witness of animal magnetism, and placed the central fact of mesmerism beyond all further dispute. In opposition to this it is to be noted, and the point cannot be too strongly insisted upon, that the primary and cardinal fact on which Braid founded all his theories of hypnotism was the purely subjective origin of its phenomena. Everything depended on the physical and mental condition of the patient; not on the volition or passes of the operator which threw out magnetism, or called into action some occult fluid or medium. Braid never swerved from this view. Later, he repeated it more emphatically, and demonstrated experimentally that all the phenomena attributed to magnets, metals, drugs in sealed tubes, &c., could be equally well produced by direct or indirect suggestion when the supposed exciting agents were absent. Thus, a wooden magnet acted like a real one when the subject was deceived as to its nature, whereas a genuine one produced nothing if the subject did not know it was there.

According to Waite, "the metallo-therapeutic theory, first discovered by Burq and developed by Charcot, inaugurated a new era of hypnotism, and led to that long series of researches connected with the Salpêtrière School of Paris, which have done so much to obscure, if not, indeed, to tarnish, the rival lustre of the Nancy School of Liébault."

This view of metallo-therapeutics is many years too late. The opinions of Burq, which were shared by Elliotson and the mesmerists of his day, were successfully combated by Braid. Charcot simply revived an ancient fallacy, which the Nancy School, following in Braid's footsteps, again overthrew. As far back as the International Congress of Psychology of 1892, the Charcot theories had practically ceased to excite scientific interest.

The assertions of the mesmerists as to the clairvoyant powers of their subjects were described by Braid as opposed to all that was known of physical science. The following, he said, were



frequent sources of error in clairvoyant experiments :—(1) The hyperæsthesia of the organs of special sense, which enabled impressions to be perceived through the ordinary media that would pass unrecognised in the waking condition. (2) The docility and sympathy of the subjects, which tended to make them imitate the action of others. (3) The extraordinary revival of memory by which they could recall things long forgotten in the waking state. (4) The remarkable effect of contact in arousing memory. (5) The condition of double consciousness or double personality. (6) The vivid state of the imagination, which instantly invested every suggested idea, or remembrance of past impressions, with the attributes of present realities. (7) The tendency of the human mind, in those with a great love of the marvellous, to erroneously interpret the subject's replies in accordance with their own desires. (8) Deductions rapidly drawn by the subject from unintentional suggestions given by the operator.

According to Braid, the belief in thought-transference was also the result of careless experiment, and he had never met with a subject who could divine his thoughts when their transmission by the recognised media had been rigorously excluded.

Braid did not believe that mesmeric subjects possessed intuitive powers. Doubtlessly some of them successfully predicted their own hysterical attacks, but the prophecy simply produced its own fulfilment through self-suggestion.

According to Mr. Waite, "it has been rightly observed that Braid, the discoverer, so to speak, of suggestion, by no means realised the possibilities of suggestion of the unconscious kind." Bernheim, and other writers unacquainted with Braid's later works, had previously made similar statements. It is difficult, however, to understand how Mr. Waite could commit a similar error. Braid repeatedly, clearly, and emphatically pointed out that unconscious suggestion accounted for all the phenomena which the mesmerists attributed to magnets, metals, and occult fluids. Sometimes, he said, the suggestions were given in their most obvious form by the operator verbally predicting in the subject's hearing the nature of the phenomena which ought to appear. At others they were given less directly by passes, manipulations, excitation of the muscles of expression, &c. ; but these owed their power, not to their physical influence, but to the ideas they excited in the subject's mind. When all forms of suggestion were rigorously excluded, the mesmeric phenomena did not appear. This, Braid asserted, proved the influence was a mental one; were it electric, suggestions were as unnecessary in the case of the subject as in that of a galvanic battery.

Apparently Mr. Waite believes in animal magnetism, metallotherapeutics, phrenology, and clairvoyance. All these things Braid successfully combated, and to attribute to him any belief in their existence shows an absolute failure to grasp the spirit and significance of his teaching.

J. MILNE BRAMWELL.