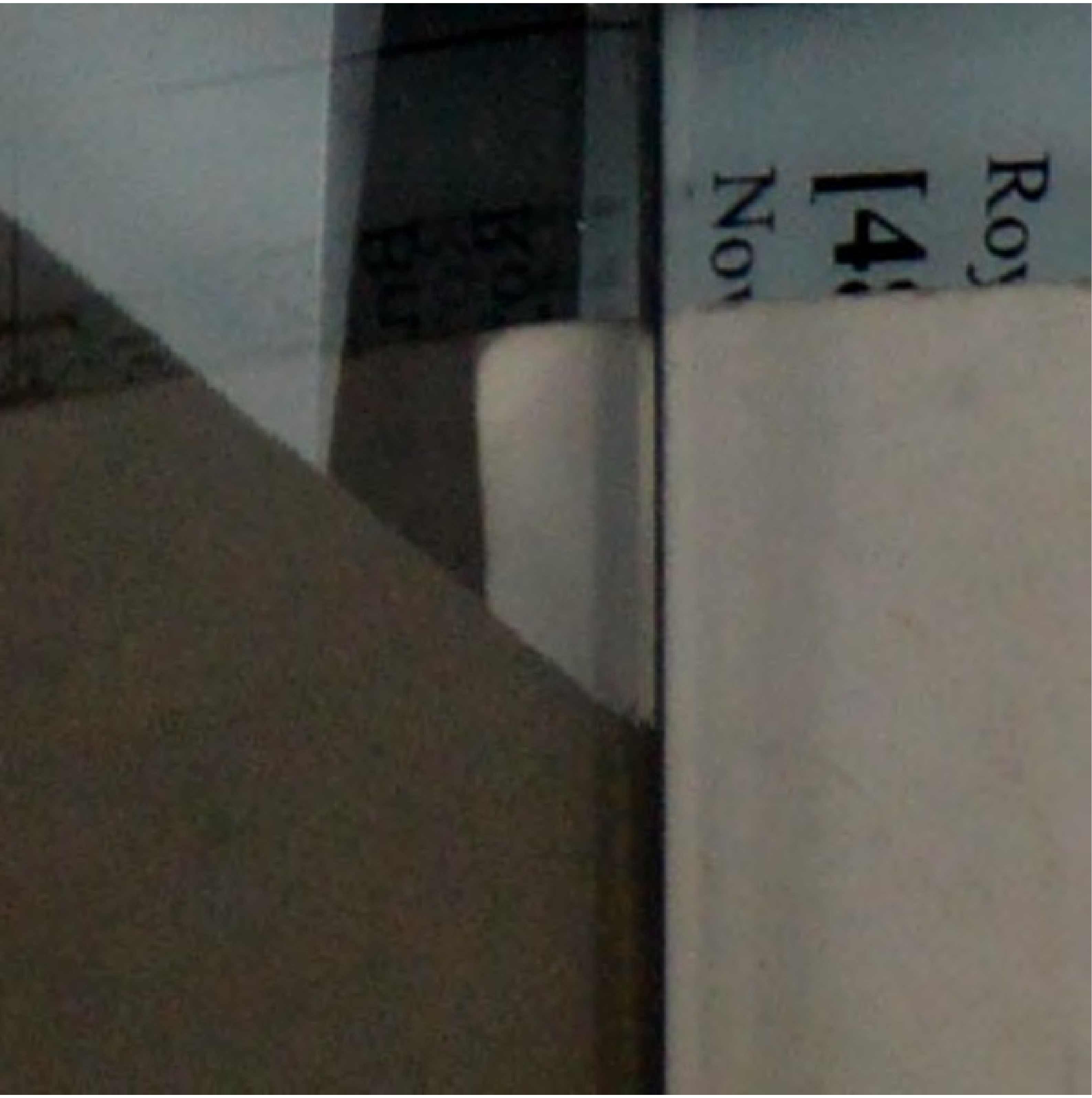
Hallucinations and allied mental phenomena / by Sir Lauder Brunton.



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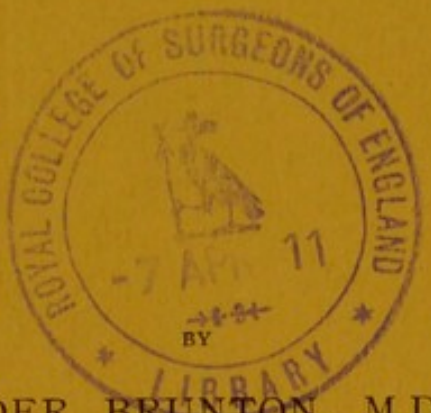

Sir LAUDER BRUNTON, M.D., F.R.S.

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HALLUCINATIONS AND ALLIED MENTAL PHENOMENA.

By Sir LAUDER BRUNTON, M.D., F.R.S.(1)

"*The wicked flea.*"—Everybody knows the "wicked flea," for it is no respecter of persons. It makes its home in the palace of the prince, the hovel of the savage, and the tent of the Arab. The devotions of many a worshipper are destroyed by the *Pulex tabernaculi*, or church flea, which makes up by its voracity on Sundays for enforced abstinence on other days of the week; and one of the wonders narrated by travellers is that on camping in the desert they have found this wicked little creature waiting for them, ready to bite, although apparently its progenitors from time immemorial could hardly have had an opportunity of gratifying their taste for blood. When in Rome one summer, fleas were abundant in the hotel where I was staying. I used to walk barefooted about my room every morning, and soon a prick on the instep would warn me that a flea was there. I looked down, saw a little black speck, put a wet finger upon it, and after a little rub would transfer it to a basin of water. The sensation of something solid between the finger and thumb and the transference of the black speck from my instep to the water convinced me of the presence of the flea, for I had the threefold evidence (1) of common sensation, (2) of sight, and (3) of muscular sense all combining to prove the actual existence of the flea. At other times during the day I had the evidence of sensation to indicate to me that fleas were again biting, and I felt quite convinced by sensation alone

that such was the case, for although I could not corroborate the evidence of sensation either by sight or by muscular sense, yet it was not contradicted by these senses. But sometimes I have felt upon my hand a sensation exactly similar to the bite of a flea, and yet, as the hand has been on my writing-table within full vision, and no object whatever was to be seen on the hand, I have discarded the evidence of sensation in favour of that afforded by sight, and come to the conclusion that no flea either was or had been upon my hand. Had it not been for the sensation of sight, however, and had the hand been hidden from my view, I should have confidently believed that it had been bitten, trusting to the evidence of sensation, which, though unconfirmed by sight or muscular sense, was not contradicted by these senses.

"*The wicked flee when no man pursueth.*"—I have purposely chosen this common illustration ; firstly, because it is familiar to the experience of every one ; and secondly, because it was suggested to me by the phrase "the wicked flee when no man pursueth,"([2]) a phrase descriptive of violent exertion combined almost certainly with the painful emotion of great terror without any objective cause. The terror and the flight are both due simply to a belief in the presence of pursuers when such pursuers do not exist in reality, but only in imagination.

Effects of imagination.—The degree of vividness with which the supposed pursuit is present to the imagination of the pursued may vary within wide limits. He may simply believe that he is pursued without his senses giving him any evidence of the fact, but sometimes the mental excitement may be so great that it is transferred to the organs of sense, and he may actually believe that he hears their footsteps and distinguishes voices, or even that he sees the pursuers themselves in the distance. After outrunning and escaping from his imaginary pursuers he would, in such an instance as this, give a graphic account of how he had seen and heard them—an account which, relying on his senses of sight and hearing, he would believe to be true, though in reality it was perfectly false.

Credulity and scepticism.—In primitive communities the attitude of men's minds tends towards credulity. They are ready not only to accept the evidence of their own sensations, but also the statements of others, even when their own sensations

fail to afford evidence of the existence of the things which others declare they have seen or heard. They are inclined to attribute blindness or deafness to themselves rather than falsity of vision or hearing to another. In more civilised countries, however, excessive credulity is checked by scepticism. Statements made by an individual which are in contradiction to the sensations or ideas of the majority are disbelieved, and scepticism is, indeed, frequently carried to excess, and statements of facts are scouted as untruths. A good example of this is the complete incredulity with which Du Chaillu's statement of the existence of gorillas was met, until its truth was proved by the actual production of skeletons and skins of the gorilla.

Positive and negative evidence.—Until this was done the evidence in favour of the existence of a gorilla was the same as that of the existence of fairies, in so far as it depended upon individual testimony. It differed in this respect, however, that Du Chaillu had checked the evidence of sight by other senses; and although this evidence was not confirmed, yet it was not actually disproved by the evidence of others, who, although present, had not seen the animals he described. The existence of fairies, on the other hand, rests on the evidence of people who had seen and heard them, and sometimes been touched by them, but whose evidence as to anything objective was disproved by that of their neighbours, who saw, heard, and felt nothing at the moment when the fairies were alleged to have been present.

Definitions.[3]—Before proceeding further to discuss the evidence of our senses, it may be well to state the meaning which I attach to some words which will be sure to come into the discussion. By hallucination I understand a sensation perceived by the individual without any objective cause; by illusion, a wrong perception excited by some external cause. By vision I understand an hallucination or illusion of the sense of sight; by apparition I understand a vision respecting some particular individual known to the observer.

Usually it is the action of stimuli on the peripheral ends of sensory nerves that excites sensations, but similar sensations may be produced by irritation of the large nerve-trunks into which the peripheral branches unite in their passage upward to the brain, or of the nerve-centres in the brain itself, although

the peripheral branches have received no stimulation whatever. Yet under such circumstances sensation is usually referred by the individual to that part of the body to which the peripheral branches of the nerve are distributed, and from which sensory impulses would ordinarily be received. Thus when the trunk of the ulnar nerve, usually known as the "funny bone," is either twitched or struck at the elbow the sensation is chiefly referred to the fingers, to which the peripheral branches of the ulnar nerve are distributed, although no irritation has been applied either to the fingers themselves or to the peripheral branches of the ulnar nerve in them. In the same way, after a leg has been amputated a man very often complains of pains in his toes at change of weather. The reason is that the end of the nerve in the stump becomes liable to irritation from atmospheric changes, and this irritation is referred to the toes in the same way as the sensation caused by a twitch or blow on the "funny bone" is referred to the fingers. Similarly, irritation of the cerebrum, or brain proper, may produce sensations of pain, of feeling, of sight, or of hearing, although the peripheral nerves and nerve-trunks, which would ordinarily create such sensations, have not been stimulated at all. In this way impressions of sight or of sound, of touch or of pain, may be excited in the nerve centres, and they are referred by the individual to the periphery just in the same way as excitement of nerve-trunks. In this way a person supposes himself to be conscious of impressions made upon his senses from without, although such impressions are due entirely to changes in his own nervous system.

Perception of sensations.—All physiologists are now agreed that the perception of sensations occurs in the cerebrum, or brain proper. Those changes in the cerebral cells which are correlated with the perception of sensations are usually originated by impressions made upon the peripheral organs of sense—the eye, the ear, the nose, the tongue, or the skin, etc. The peripheral organs of sense, again, are affected by external objects, and it is from the impressions thus made upon them and transmitted from the sense organs, through the nerves, to the brain that we form our ideas regarding external objects. It is evident that the correctness of these ideas will depend upon the perfection with which (1) the organs of sense, (2) the transmitting nerves, and (3) the brain-cells perform

their functions, and that imperfection in any one of these structures may lead the individual to form erroneous notions regarding the external world.

Eyes and ears in different people.—I believe that people generally do not make sufficient allowance for differences between their neighbours' eyes or ears and their own.

In a most interesting lecture delivered several years ago at the Royal Institution, Liebreich pointed out that the peculiar character of Turner's later pictures was due to an alteration in his eye which caused him to see points as perpendicular lines —a condition which is easy to imitate by looking at lights with the eyes almost but not completely shut. He showed also that the purple tones in Mulready's later works were due to a yellowness in the painter's vision which caused him to use too much blue in the endeavour to obtain the correct colours in his pictures.

For my own part, I confess that at one time it never occurred to me that certain so-called impressionist pictures, with large blotches of colour and vague outlines, might actually represent what the painter himself saw, because all the objects that I saw had sharp and distinct outlines—so distinct, indeed, as to distract my attention from the colour of the objects. But since I have become to a certain extent presbyopic and wear glasses, I find that by using lenses that are too strong for my eyes the outlines of objects become blurred, but at the same time their colour becomes much more distinct and impressive, my attention being no longer directed away from it by the outlines. I am therefore inclined to think that the so-called impressionist pictures may not be due to a simple desire on the part of the painters to put down on canvas something that neither they nor anybody else have ever seen, but may really be due to defective vision on their part, so that they deserve pity instead of scorn.

Acuteness and range of sight and hearing.—A greater range of colour-vision allows some people to see things to which others are quite blind. For example, I know that others see in a fire on a winter's evening lovely blue and violet flames, while I myself see nothing but red and yellow ; and to those who are able to hear the note of a bat the air of a summer's eve may be full of shrill shrieks, while to others there will be perfect silence. Extreme acuteness of hearing may give to

some people what seems to be almost a prophetic power denied to others, as is shown by the following incident.

My friend Professor H. C. Wood, of Philadelphia, told me that when out hunting he found his senses were, as a rule, quite as acute as those of any of his companions, whether they were Red Indians or white men. On one trip, however, he had with him an Indian hunter whose acuteness of hearing seemed almost preternatural. On one occasion this Indian said, "Two men and a woman are crossing the lake, and will be here in about half an hour." Wood asked him how he knew. He said by the splash of the paddles and the sound of their voices. The distance was so great that Wood thought at first it was mere fancy on the Indian's part, but the appearance of the travellers at the time the Indian mentioned showed that he was quite correct. In the same way the sense of smell may be preternaturally acute, and one lady told me that she was able to recognise coats belonging to different people by the smell. The extreme delicacy of touch attained by some people is little short of miraculous, and it is said that some of them can even distinguish the colours of stuffs and substances otherwise alike.

Divining rod.—Some people also seem to have a peculiar power of appreciating moisture, though they themselves cannot tell by what sense they do so. These people appear to have the power of discovering water, even at a considerable distance under the surface. The use of the divining rod is usually a subject of ridicule ; but for my own part I quite believe in it, because I have known people who possess the power, and although I have not actually seen them exercise it I have not the least doubt that their statements regarding it are true. It seems to me not improbable that they are enabled to perceive the presence of water through some vague sensation occurring in the joints or fibrous tissues when water is near, and this gives rise to slight involuntary movements, whereby the rod in their hand moves. I have been led to think this by the case of an old lady, one of my patients, which seems to supply the clue to the mode of action of the divining rod. She was very rheumatic and suffered much pain in her joints, especially at change of weather or in any damp place. So great was her sensibility to damp that she told me she could tell if she were driving over a bridge or near water even when her eyes were

closed. In fact, she said, "Wherever you would see fog on a summer's morning when the sun is just rising, I should feel it if I were driving over that place at midday." The divining rod itself I regard as a mere indicator of involuntary muscular action magnifying slight movements, in the same way as the lever of the sphygmograph magnifies the lever of the pulse.

In his poem on *Signs of Rain*, Edward Jenner, the discoverer of vaccination, has the lines—

> Hark how the chairs and tables crack!
> Old Betty's joints are on the rack.

The cracking of chairs and tables, of course, is due to the absorption of moisture by the dry wood, and its consequent swelling, so that a strain is put on the joints of the various pieces composing the table. The cause of the pains in old Betty's joints is less evident, but probably both they and the divining rod are phenomena more complicated, yet of the same kind as the cracking of the tables, the turning up of the under sides of leaves from swelling of the petioles, and the appearance of a man instead of a woman before rain in the old-fashioned weather-glass, where the string suspending the little figures twisted or untwisted according to the amount of moisture in the air.

Indeed, I think it is quite possible that an ordinary galvanometer needle suspended by a thin thread of twisted silk impregnated with calcium chloride or some other hygroscopic material might serve as a "dowser" in the absence of any man or woman possessing the nervous sensitiveness necessary to move the divining rod in the usual way.

Failure of the divining rod.—In his *Curious Myths of the Middle Ages*, Baring-Gould tells the story of a man who traced murderers from the scene of their crime for a long distance by means of the divining rod. He was brought to Paris, and his failure to track people there led to his being utterly disregarded; but if we read the whole story, and in place of putting in the words "man" and "rod" we use "bloodhound" and "nose," every one will say that the story is perfectly natural, and no one would wonder much that a bloodhound who could follow a track in the country might fail to find it in crowded streets. There seems, in fact, to be nothing more extraordinary

or incredible in one man finding water by the divining rod, while another cannot, than there is in the well-known facts that a camel becomes conscious of the vicinity of water long before a man, or that some people can hear high notes inaudible to others, as anyone can test for himself by means of a Galton's whistle.

Causes of Alterations in the Keenness of the Senses.

Peripheral changes.—Keenness of the senses may be increased or diminished by local alterations either in the nervous centres or the peripheral sense organs. As an example of the latter we may take the application of strychnine to the eye, which is said to increase the keenness of sight, while the sense of hearing may be gradually diminished by blocking of the auditory meatus by wax or the Eustachian tube by mucus whilst the effect of cocaine in abolishing common sensation is now universally known. Excessive keenness of the senses may be due to changes in the brain; and in one case which I knew of inflammation of the brain, the sense of hearing during the illness became so extraordinarily acute as to remind one of the Indian hunter whom I have just mentioned. Everyone knows the appearance of flashes of light which occur if the eye is struck in the dark, and the lovely peacock's feather which can be seen if one gently presses on the eyeball, especially from its nasal side. We thus see that some people, through the natural acuteness of their senses, recognise objective conditions such as the blue flame of carbonic oxide, the screeching of a bat, or the presence of moisture of which other people are quite unconscious, while on the other hand buzzing or ringing in the ears, flashes of light, or visual appearances may occur from changes in the organs of sense without any corresponding external object.

Cerebral conditions.—But the perception of impressions transmitted to the brain from the organs of sense depends much on the condition of the brain itself. Many impressions pass unheeded, for in walking through a crowded street we see numbers of people of whose presence we are conscious only so far as to avoid collisions, and whom we do not remember. Yet it is possible that many of these impressions o

which we appear to be quite unconscious, and of which we have no recollection, may yet have imprinted themselves in some way upon the nerve-centres, and of these we may possibly again become conscious under other circumstances. Everyone knows the powerful influence of smell in recalling scenes and persons—so much so, indeed, as occasionally to make one feel as if one were living a second time. Twenty years ago I suffered from malarial fever very severely and was obliged to go abroad. My wife and I took passage on a P. and O. boat. The passage to Gibraltar was very rough and the weather in the Bay of Biscay very stormy, so that my wife was unable to eat anything on the whole passage, and subsisted chiefly on limes and dry biscuits. From Gibraltar we went to Tangiers, and the passage there was also exceedingly bad. Some years afterwards my wife, in going out of the dining room, just as we had risen from dinner, suddenly said, "I do not know what is the matter with me—I feel quite ill, just as if I were going to be sea-sick." She was unable to perceive any cause for this sudden feeling, but from where I was sitting I could see that she had just passed some Tangerine oranges, which were on a side table in a position where she was unlikely to notice them. She was not conscious of the smell, but she was conscious of the associated ideas of Tangiers and sea-sickness. In the same way the sense of hearing may give rise to associated ideas without the sounds rising into consciousness. Several years ago I was one night dressing for dinner on the second floor of my house, and all at once, without any reason for it that I could perceive, I began to think of a man whom I had seen two or three years before, although there was nothing apparently to recall him to my memory at that particular moment. On going down to my study on the ground-floor I found this very man there. I have very little doubt that I had dimly heard his voice, and this recalled him to me, although I was not conscious of hearing anything. I believe, however, that a dog would have been definitely conscious of his presence, whereas I had only a vague suggestion of it. Some people have an extraordinary memory for sounds or voices, just as others have for faces, and in them the recurrence of a sound may occasion a definite sensation instead of a vague impression Some time ago one of the nursing sisters in St. Bartholomew's Hospital heard a peculiar footstep on the stair outside her

ward, and said, "If he were in the hospital I would say that was So-and-so's footstep," mentioning the name of a patient who had been under treatment in her ward more than ten years before. It turned out afterwards that this patient had returned to the hospital, and it was really his footsteps she had heard. Such exact recollection is, however, rare, and I believe it is vague suggestions, caused by the sounds of footsteps or voices of approaching people, that give rise to the proverbial appearance of people who are being spoken about. A curious example of a sensation, apparently unfelt at the time, being afterwards recalled, occurred in the case of a friend of mine. He had a tooth extracted under nitrous oxide, and during the extraction made movements as if conscious of pain, but on awaking from the anæsthetic he had no remembrance of any painful sensation. Next night, however, he dreamed the whole thing over again, and felt the pain of extraction in his dream. The perceptive centres have been well compared to a palimpsest, in which the various writings have been washed out again and again, but the last writing may blur in one place, or render legible in another, the remnants of the words previously written there. It is extraordinary how the impressions of our senses are modified by our ideas. Everyone knows how the glowing coals in the fireplace on a winter's night take all sorts of forms and faces; and one sees the influence of ideas constantly in medical students who are learning auscultation, who hear, on listening to the chest of a patient, what they think ought to be there, and not the sounds which are actually there. I well remember an instance of this sort occurring in my own case in regard to colour. The late William Black, the novelist, and I were watching the Falls of Niagara together. Black, who had a wonderful eye for colour, asked me what was the colour of the body of water before it began to fall over the cliff. Looking at it I said, "It is dark bottle-green," a colour which I had seen in water before. "No," replied Black, "it is livid purple." At first I thought that he was mistaken, but on looking carefully I found that he was quite correct, and that in giving my answer I had disregarded the evidence of my senses in favour of a preconceived idea. Everyone knows the story of the practical joker who collected a crowd at Charing Cross, and by the simple means of suggestion got many people to believe that the stone lion

which formerly stood over Northumberland House actually wagged its tail. I have heard it said, though I do not know with what truth, that one of the extraordinary juggling tricks shown in India depends upon suggestion for its success. A man erects a pole, and up this pole a boy seems to climb to the very top, and then to disappear. Yet a camera, while it shows the pole, does not show a boy climbing upon it at all. The vision of the boy climbing and ultimately disappearing is said to be entirely subjective on the part of the beholders, and no boy has been climbing at all. In this case a suggestion conveyed from the sense of hearing has awakened in the brain a visual sensation.

Thought-transference.—In some experiments that I made some years ago on thought-transference I noted a similar condition, in which a stimulus which would ordinarily have awakened one sense was actually perceived through another sense. When seated, together with my wife, in a very quiet country cottage, she opened a volume of the Psychical Society's *Transactions* and looked at a page of diagrams. She put her hand upon mine while she looked at this, and I quite felt that her hand moved very slowly on mine, but I was quite unable to make out by the sense of touch what the movement was. On closing my eyes, however, a spectrum rose before me very like what one sees when one closes one's eyes after looking at an incandescent lamp. The spectrum that I saw was of a triangle enclosed in a circle (Fig. 3). I drew this, and on comparing it with the figures at which my wife was looking, I found the triangle I saw was almost identical with one on her book (Fig. 1), but while she was looking at it her attention had strayed to the next page on which was a line enfolding itself so that part of it formed a circle (Fig. 2). These two figures had combined themselves in the spectrum that I saw, and which, no doubt, had been excited in my visual centres by the movement of her hand upon mine unconsciously drawing the figures she saw. The stimulus thus produced had probably passed up the nerves to the centre for touch in my brain, but had there excited only a vague feeling, while in the centre for sight it had raised a definite perception. In the same way I found that an impression might pass from the sense of hearing to that of sight. Sitting a few feet off, I closed my eyes while my wife drew on

the floor some simple patterns copied from the book already mentioned. One of them was a circle with a single stroke passing outwards from the centre (Fig. 4), and this I reproduced almost exactly, with the exception that, instead of making one stroke from the centre, I drew a bundle of rays (Fig. 5). It is very easy to make out whether a person is drawing a triangle, a square, or a circle on

FIG. 1.

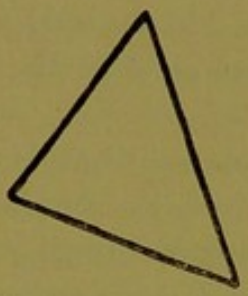


Diagram looked at in a book.

FIG. 2.

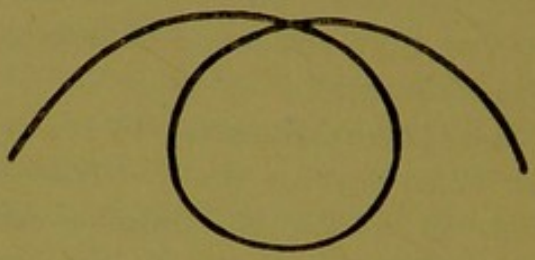
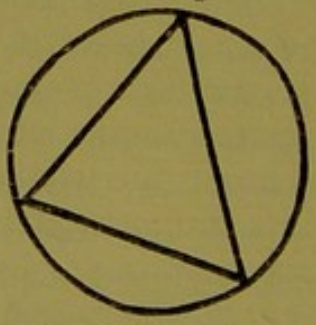


Diagram to which the gaze wandered from Fig. 1.

the back of one's hand with a point if the figure be large enough, but as the figure gets smaller and smaller it becomes impossible to define it by the sense of touch, and then the sense of sight appears to take up the work and produce the spectra I have described ; but there is a limit even to this, and if the drawings or movements on the back of the hand are very

FIG. 3.



Spectrum combining Figs. 1 and 2.

small the spectra become indefinite and unlike those at which the draughtsman is looking. I once tried to repeat this experiment of visualising spectra through touch with my friend the late Mr. George Romanes, but the movements of his hand upon mine, although distinguishable as movements, were so slight and so limited that I could not make out what he was drawing, either through the sense of touch or of sight.

It is quite possible that the tactile sense in some persons may be much keener than in me, and that tactile sensations too slight to be perceived by them through the brain centre for touch may be perceived as spectra when they are blindfolded in a way that seems almost miraculous to others. A case which appears to be of this kind has been recorded by Dr. Davey.(3) In these experiments the visual sense was excited through the sense of hearing, and I only saw the spectra when my eyes were shut.

Visions—voluntary.—It is possible for some people with their eyes shut, and by a vigorous effort of will, to call up some familiar face or scene; very rarely, however, can this be done with the eyes open. The late Professor Guy, of King's

FIG. 4.

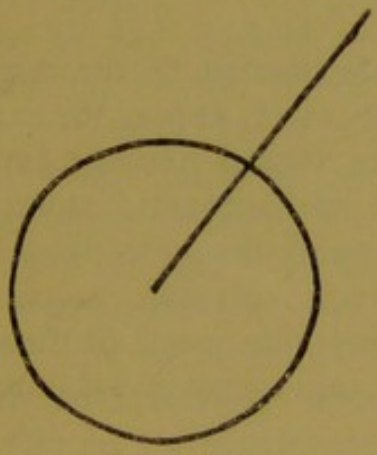
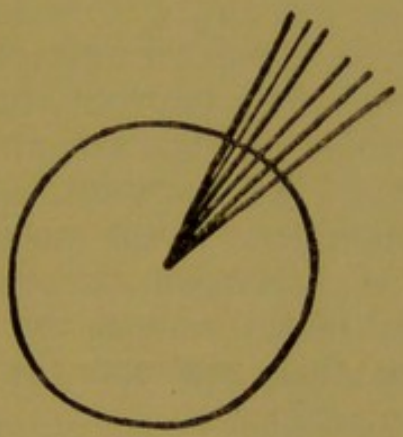


Diagram drawn on the floor with the foot.

FIG. 5.



Spectrum seen after hearing diagram, Fig. 4, drawn on floor.

College, stated that he possessed the power in his youth, and that Goethe possessed it during the whole of his life.(4)

Involuntary.—Tesla, the famous electrician, was further troubled by a strange affection of the eye, causing the rising of images so persistent that they marred the vision of real objects, and disturbed his mind. Whenever an object was named to him, its image would appear at once so vividly before his eyes that he often believed it real. This illusion caused him such discomfort that he tried his best to break it, but did not succeed until he was twelve years old. Then, for a time, he was able to banish the images, but they have since returned, though less persistently. His later observations have convinced him that these images are really the recalling of

former visual impressions, consciously or unconsciously received.(5)

Suggested visions.—In Miss Kingsley's work on West Africa she mentions a very curious way the natives have of killing some one they dislike. The assailant "throws his face" at the victim, by some process which Miss Kingsley does not describe. The consequence is that the unhappy victim sees the face wherever he turns, and by-and-by either commits suicide or dies of exhaustion. This seems to be a process of suggestion, the effect of which upon the visual centre of the brain is so powerful that the suggested object is constantly present. In this case the suggestion made by another causes an object already seen to reappear, and in all probability the powerful effect of this suggestion is due to the low development of the higher cerebral centres in the negro.

Closely associated with the African practice of throwing the face and with hypnotic suggestion is, I think, the Italian superstition of the "evil eye." Its Italian name, "Jattura," suggests "Gettar incanti," "to cast enchantment," and if this derivation be correct it would correspond closely to the African term of "throwing the face." It is certainly much more dreaded by the nervous and impressionable races of Southern Europe than amongst the more impassive inhabitants of northern climes.

Hypnotic visions.—But in the most civilised races temporary inaction of the higher centres may render the individual susceptible to suggestion to such an extent that he will completely disregard the impression of his own senses, and act only upon the suggestions made to him. Thus in an hypnotic *séance*, in which I had not the slightest doubt of the *bonâ fides* both of the subject and of the operator, I have seen a man avoid obstacles where there were none, try to sit down on a chair which was not there, drink mustard and water with the greatest gusto, and spit out pure water as if it had been a most filthy concoction. These are some of the very commonest effects of suggestion, and there are many others more complicated and more interesting, but I need not further dwell upon them.

One of the most common ways of producing an hypnotic condition is to stare intently at some luminous object, preferably held above the level of the eyes. But intense concentra-

tion of vision, even on an object which is not luminous, is sufficient to produce this state, and the monks of the Monastery of Mount Athos are said to have thrown themselves into a condition of trance, in which they supposed themselves to be conducted to heaven, by each man persistently staring at his umbilicus. By steadily staring into the fire some people are able to bring on a dreamy condition, in which their fancy seems to be freer from the trammels of sense than at other times ; and persistent staring at a crucifix may not improbably have led to the visions of many religious enthusiasts, as well as to the curious feeling of levitation or floating in the air which many of them have experienced.

Hypnotism is not a condition which occurs only in man ; it can be produced also in animals. The old experiment in parlour magic of hypnotising a fowl by pressing its beak gently to the ground, and drawing a chalk line straight onwards from the point of the beak, succeeds easily and perfectly, even in a crowded lecture room, as I have many times proved. Langley succeeded in hypnotising young crocodiles, and Preyer hypnotised frogs so completely that they sat still until they dried up to mummies, although there was no obvious reason why they should not move as they liked. The hypnotic condition is, I think, probably due to two or more nervous currents acting in opposite directions, and its probable mechanism may become to some extent intelligible from the old illustration of a donkey dying of hunger between two bundles of hay so equally attractive that it could not turn towards one bundle for a bite on account of the equal and opposite attraction of the other bundle drawing it in a different direction.

Hypnotism is, I think, to be classed with many other phenomena under the head of "Inhibition," but these I have discussed at length elsewhere, and it would take too long to enter into them now.([6])

One of the most interesting phenomena of hypnotism is that of deferred suggestion, in which, during the hypnotic sleep, the operator suggests to the subject that hours, days, or even months afterwards he shall do something at a certain time.

Premonition.—Closely allied to this is one form of premonition. An intimate friend of my own, who at that time

was Surveyor-General of Canada, told me that on one occasion he had a premonition that some misfortune would befall him unless he was at a certain place on a certain day. He left his occupation, and travelled 200 miles across the prairie to arrive at the place which he had in his mind. On his arrival he found that his premonition was perfectly correct, and that misfortune would have befallen him had he not been there. He did not tell me what the misfortune was, and naturally I did not ask him. It appears to me that this somewhat unusual phenomenon is but an exceptional form of a very ordinary occurrence. Very many people have the power of sleeping perfectly soundly, and yet awakening at an unusually early hour to catch a train. During all the hours of sleep, however deep it may seem to be, some part of the brain appears to remain awake and to keep a record of the passage of time. Before going to sleep the individual has before him the data (*a*) that his train will start at a certain hour, and that (*b*) unless he awakes in good time to reach the station (*c*) the train will start without him. In my friend's case I think he must have had unconsciously before him, when he started on his tour over the prairies, certain data which would work out a definite result in a given time if he were not there to prevent it. During both the time of sleeping and waking these data were present to his mind, and as the problem approached solution he felt that he must needs go to prevent the result from being worked out.

Some of the forewarnings that occur in dreams are, I think, of a similar kind. The poet says, "For morning dreams presage approaching fate, And morning dreams as poets tell are true." Now the dreams that occur in the morning on awakening are usually more or less closely associated with the thoughts that occupied the mind on going to sleep. In my own case, I find that if I am awakened in the middle of the night from a deep sleep, any dream that occurs at the moment of awaking has a starting-point in some occurrence several days back.

Rain areas and pain areas.—Other premonitions may, I think, be due to atmospheric conditions. For example, my wife on one occasion was induced to travel back from France to Ireland by a very strong impression that her mother needed her, and to the great astonishment of her

friends she arrived at home and found that it was so. I am inclined to regard this as a phenomenon of the same character as the occurrence of neuralgic pains at or about the same time in places far apart, in men who have suffered from gunshot wounds. During the American War, Weir Mitchell took a particular interest in gunshot wounds, and after the war was over his patients were distributed throughout the States. He was interested to find that on one day he would get a batch of letters complaining of their wounds from patients in the Far West, and a day or two after from others in the middle of the States, and a little later from those in the east. On

FIG. 6.

Relation of pain area to rain area (after Weir Mitchell).

comparing these complaints with the meteorological records, he found that a wave of rain and a wave of pain were travelling across the States at the same time. These areas were concentric, but the rain area was much smaller than the pain area. All those in the rain area who felt their wounds troubling them saw that the weather was disturbed, and were satisfied as to the cause of pain ; but those in the pain area saw no reason for the pains they were suffering, although they were in reality due to the same meteorological causes as those in the rain area.(7) The radius of the pain area was no less than 150 miles greater than that of the rain area, and that of the rain area from the storm centre was 550 to 600 miles. I am inclined to think

that my wife's action was probably caused by some meteorological change which had previously been associated in her mind with some ailment in her mother requiring her care. The same meteorological condition had probably occasioned in the mother the need for care, and in the daughter the sensation of being needed. The meteorological condition here had had an effect in recalling sensations similar to that of the sense of smell to which I have already alluded.

Brain waves.—All the phenomena that I have described seem fairly easy of explanation, but there is a certain residue which is difficult or impossible to explain by ordinary causes. For instance, I have known the case of a lady who dreamed during the Crimean War that her son, who was before Sebastopol, was injured in the right foot. Some months afterwards an officer in his regiment came back to England and told her that her son was injured in the left foot. "No," said she, "it was in the right foot"; and it turned out that she, who only knew of it from her dream, was right, and the officer who came to bring the news was wrong. Many such phenomena may be regarded as mere coincidences, but I think they cannot all be dismissed in this way, and the discovery of wireless telegraphy seems to render it quite possible that the brains of different people may occasionally be so *en rapport* that they act together like the transmitter and receiver in Marconi's system. This theory was first propounded under the title of "brain waves" by Mr. James Knowles in a letter to the *Spectator* of January 30th, 1869, and the prevision showed in this letter is so remarkable that I think it worth while to quote a large extract from it:

> Let it be granted that whensoever any action takes place in the brain, a chemical change of its substance takes place also; or, in other words, an atonic movement occurs; for all chemical change involves—perhaps consists in—a change in the relative positions of the constituent particles of the substances changed.
>
> [An electric manifestation is the likeliest outcome of any such chemical change, whatever other manifestations may also occur.]
>
> Let it be also granted that there is, diffused throughout all known space, and permeating the interspaces of all bodies, solid, fluid, or gaseous, an universal impalpable elastic "ether," or material medium of surpassing and inconceivable tenuity.
>
> [The undulations of this imponderable ether, if not of substances submerged in it, may probably prove to be light, magnetism, heat, etc.]
>
> But if these two assumptions be granted—and the present condition of discovery seems to warrant them—should it not follow that no brain

action can take place without creating a wave or undulation (whether electric or otherwise) in the ether; for the movement of any solid particle submerged in any such medium must create a wave?

If so, we should have as one result of brain action an undulation or wave in the circumambient, all-embracing ether—we should have what I will call brain waves proceeding from every brain when in action.

Each acting, thinking brain would then become a centre of undulations transmitted from it in all directions through space. Such undulations would vary in character and intensity in accordance with the varying nature and force of brain actions, *e. g.* the thoughts of love or hate, of life or death, of murder or rescue, of consent or refusal, would each have its corresponding tone or intensity of brain action, and consequently of brain wave (just as each passion has its corresponding tone of voice).

Why might not such undulations, when meeting with and falling upon duly sensitive substances, as if upon the sensitised paper of the photographer, produce impressions, dim portraits of thoughts, as undulations of light produce portraits of objects?

The sound-wave passes on through myriads of bodies, and among a million makes but one thing shake, or sound to it; a sympathy of structure makes it sensitive, and it alone. A voice or tone may pass unnoticed by ten thousand ears, but strike and vibrate one into a madness of recollection.

In the same way the brain wave of Damon passing through space, producing no perceptible effect, meets somewhere with the sensitised and sympathetic brain of Pythias, falls upon it, and thrills it with a familiar movement. The brain of Pythias is affected as by a tone, a perfume, a colour with which he has been used to associate his friend, he knows not how or why; but Damon comes into his thoughts, and the things concerning him by association live again. If the last brain waves of life be frequently intensest—convulsive in their energy, as the fire-fly's dying flash is its brightest, and as oftentimes the "lightning before death" would seem to show—we may, perhaps, seem to see how it is that apparitions at the hour of death are far more numerous and clear than any other ghost stories.

He narrates the story told to him by Mr. Robert Browning, who said that—

when he was in Florence, some years since, an Italian nobleman (a Count Ginnasi, of Ravenna) visiting at Florence was brought to his house, without previous introduction, by an intimate friend. The Count professed to have great mesmeric or clairvoyant faculties, and declared, in reply to Mr. Browning's avowed scepticism, that he would undertake to convince him somehow or other of his powers. He then asked Mr. Browning whether he had anything about him then and there which he could hand to him, and which was in any way a relic or memento. This, Mr. Browning thought, was perhaps because he habitually wore no sort of trinket or ornament, not even a watchguard, and might, therefore, turn out to be a safe challenge. But it so happened that,

by a curious accident, he was then wearing under his coat sleeves some gold wrist studs to his shirt, which he had quite recently taken into use, in the absence (by mistake of a sempstress) of his ordinary wrist buttons. He had never before worn them in Florence or elsewhere, and had found them in some old drawer where they had lain forgotten for years. One of these gold studs he took out and handed to the Count, who held it in his hand awhile, looking earnestly in Mr. Browning's face, and then said, as if much impressed, "C' è qualche cosa che mi grida nell' orecchio, 'Uccisione! uccisione!'" ("There is something here which cries out in my ear, 'Murder! murder!'")

And truly (says Mr. Browning) those very studs were taken from the dead body of a great-uncle of mine, who was violently killed on his estate in St. Kitt's, nearly eighty years ago. These, with a gold watch and other personal objects of value, were produced in a court of justice as proof that robbery had not been the purpose of the slaughter, which was effected by his own slaves. They were then transmitted to my grandfather, who had his initials engraved on them, and wore them all his life. They were taken out of the nightgown in which he died, and given to me, not my father. I may add that I tried to get Count Ginnasi to use his clairvoyance on this termination of ownership also; and that he nearly hit upon something like the fact, mentioning a bed in a room; but he failed in attempting to describe the room—situation of the bed with respect to the windows and door. The occurrence of my great-uncle's murder was known only to myself of all men in Florence, as certainly was also my possession of the studs.

In general, thought is communicated from one man to another by the muscular movements which originate speech, alter facial expression, or produce gestures or writings, and not unfrequently the unconscious thought conveyed by facial expression belies the statement made by the lips. In Mr. Browning's case it seems possible that Count Ginnasi could read in the unconscious expression of Mr. Browning's face something which led him to suspect some horror connected with the wrist studs. At the same time it seems possible that changes in Mr. Browning's brain may have been communicated directly, as in Marconi's apparatus, to the brain of Count Ginnasi without the intermediation of facial expression on the one hand, and of sight on the other.

Hallucinations.—Some of the various apparitions or appearances of friends, deceased or otherwise, which have been recorded upon fairly good authority may be regarded as phenomena belonging to the same class as wireless telegraphy, though in others the object seen may be due to self-suggestion. I think it probable that in both these conditions there may be no definite lesion, either of the brain or of the eye, such as might be dis-

FIG. 1.—Scotoma having the shape of a goat's head. (After Tatham Thompson.)

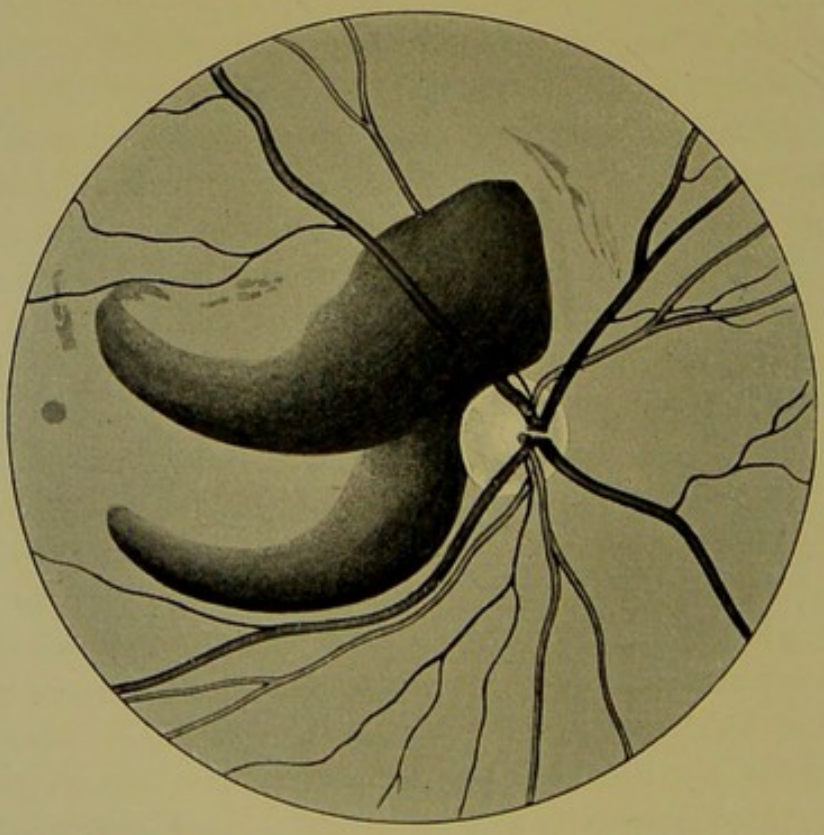


FIG. 2.—Retinal hæmorrhage giving rise to the scotoma shown in the previous figure, the lower of the two branches being limited by a vein.

To illustrate Sir LAUDER BRUNTON's paper.

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covered by the naked eye or microscopical observation, but in other cases I think some lesion probably occurs either in the eye itself or the cerebral centres. Mr. Tatham Thompson has recorded a most interesting case of a lady who came to him because she saw the head and horns of a goat constantly before her.(8) On measuring her field of vision with a perimeter he found that there was a blind spot corresponding to the figure she had described, and this was due to the bursting of a blood-vessel in the eye, and consequent injury to the retina (Pl. I). Other cases of hallucinations of vision may be due to choroiditis, *i. e.* inflammation of one of the membranes lining the interior of the eyeball. I think it very likely that this disease may be the cause of the hallucinations observed by Dr. Head in cases of *herpes zoster ophthalmicus*, a form of shingles involving the eye, and which is accompanied by a severe irritation in some of the nerves going to the eye.(9) Dr. Head found that out of eleven cases of this disease five had been subjects of typical hallucinations. One saw "a large white face at the bottom of the bed," one a "corpse"; two saw figures standing beside the bed, "misty as if wrapped in a cloak"; and one, even whilst walking the room at night on account of the pain, frequently saw a shadow without a face or limbs standing in the room. The well-known case of the German bookseller Nicolai or that of Mrs. A—, recorded by Sir David Brewster, and quoted by Huxley in his *Elementary Physiology*, as well as many others,(10) may have been due either to hæmorrhage or inflammation in the interior of the eye.

Causation of visions: organic causes.—But in the latter case there were hallucinations both of hearing and sight, as the lady several times heard voices speaking to her, while at others she saw her husband, a cat, a corpse, and deceased friends. The occurrence of these phenomena suggests irritation in the centres for hearing and sight, and it seems to me possible that they may have been due to small atheromatous particles, which, becoming detached from the walls of the blood-vessels, and carried to these centres by the current of blood, have plugged some small vessels in the brain, and thus given rise to localised irritation. But there are certain drugs which will also cause hallucinations of sight and hearing without producing any organic change. Amongst these are cannabis indica, quinine,

and salicylate of soda. A most vivid account has been given by Dumas in his *Count of Monte Christo* of the visions produced by cannabis indica, but others have failed to get a similar result, and I have no personal experience of it myself. Quinine, as everyone knows, often gives rise to the sound of bells in the ears, and salicylate of soda does the same. Quinine rarely or never gives rise to visions, but salicylate of soda does so in many people when they have their eyes shut, and in a few when they have their eyes open. In the case of an old gentleman who was taking salicylate of soda, both his friends and I were much alarmed by the patient describing processions of people all round his bed, when, with the exception of a single attendant, no one was in the room. At first I thought that the patient was delirious, but I found that the pulse was quiet, the temperature normal, or rather subnormal, and I therefore concluded that the visions were probably due to irritation of the visual centre by the salicylate, of a similar nature to that which so frequently occurs in the auditory centre. The correctness of this hypothesis was proved, I think, by the fact that a very short time after the salicylate was left off the visions disappeared. I think it not unlikely that irritation may be caused also by commencing inflammation, which may ultimately lead to epilepsy and mental aberration. I once met with a curious case in J. S—, a student at St. Bartholomew's Hospital. He came to me one day in a state of great agitation, and told me his story. About ten days previously he had gone from the hospital to his rooms in Middleton Square. On entering the door he saw some one dressed in a brown coat sitting on an arm-chair with his feet in the fender. He did not recognise the figure, and he said, "Who are you?" thinking it was one of his fellow-students. The figure gave no answer, but shrugged his shoulders; so J. S— thought it was only a fellow-student, and repeated the question. On getting no answer he said, "You may just as well speak"; but instead of going to the figure he went aside and threw off his great-coat. The figure remained perfectly quiet until he went up to it, but on putting his hand on the figure's shoulder it entirely disappeared. He was naturally very much alarmed, but went about his work at the hospital as usual. The night before I saw him he had again gone to his lodgings, and seen the figure as before, but instead of going up to it he simply gave a loud

shriek, and fell down unconscious. My diagnosis was that he had had an epileptic seizure with a visual aura. On the first occasion he had had the aura only without the attack, but on the second he had had both the aura and the seizure. I gave him some bromide and tried to quiet his mind, but in a few days after I was sent for to see him again, and then I found that he was in a state of wild delirium, and was seeing processions of people going round and round his bed. He was taken to the hospital for a short time, but not recovering, he was transferred to an asylum. Here he remained for some time, and then he seemed to get well. He returned to his studies, but did not qualify, and then went to India. From that time onwards he seemed to be unable to get on with anyone. He thought himself that he was irritable, but he managed to get a place as librarian, and the last I heard of him, about six years ago, was that he was still in it. The story of poor J. S— reminds one very strongly of the German stories of the Waldmädchen, where a hunter or woodsman goes out in the forest, sees a vision, usually of a woman, whom he sometimes follows to some enchanted land, and then by-and-by finds himself back in the wood where he was, and, rising from a state of apparent unconsciousness, finds his way home ; but the neighbours observe he is never quite the same man afterwards —exactly as happened to poor J. S—.

The relationship of epilepsy to visions raises the interesting question of how far the so-called "seers," "prophets," and "medicine men" actually beheld visions, and how far they were able to bring them on by the antics or privations which they regard as a necessary preliminary to the exercise of their powers. Many years ago I saw a performance of "howling dervishes," and while shouting continuously "Allah ! Allah !" they waved their heads up and down and moved their bodies up and down, and left their hair flying about while they described a vertical figure of eight (8), and this went on for some time, until one man fell down in an epileptic fit. This exhibition threw a curious light upon the story of Samson, which had been to me, as it is to most children, of the utmost interest. This story is now by many critics discredited and looked upon as a solar myth, but to me it is a most vivid description of a man in whom great natural physical strength was extraordinarily exaggerated during periods of abnormal mental excitement. This excite-

ment usually came on only in consequence of some external stimulus. When a lion roared against him, he sprung at it and killed it by tearing its jaws apart. When the Philistines shouted against him, he seized the jaw bone of an ass—the first thing that came handy—and slew therewith a thousand men. His hair had never been cut from the time of his birth, and in it lay his strength. When the treacherous Delilah shaved his head and delivered him into the hand of the Philistines, he became weak as other men. Till I saw the performance of the "howling dervishes" I could not understand what Samson meant by saying, "I will go out as at other times before, and shake myself" (Judges xvi, 20). After seeing the performance, it seemed to me not unlikely that Samson was in the habit of bringing on the fit of excitement by shaking himself like a dervish, and the mass of hair which he possessed would tend to increase his excitement, and when the hair was shaven off the mere shaking had no effect. If this view be correct, the statement "Howbeit the hair of his head began to grow again after he was shaven" (Judges xvi, 22), acquires a new interest, for with its growth his supernatural strength appears to have returned, so that when he bowed himself between the pillars of the temple of Dagon he overturned them, and slew at his death more than he had ever slain in his life. I do not know that I should have connected Samson's supernatural strength with the dervish performance had it not been that several weeks before I saw it I had walked up the hill which is before Hebron. The hill is very steep, the day was very hot, and I could not help thinking what a foolish man Samson was to take the gates away from the city of Gaza, to carry them away inland for fourteen hours and right up to the top of a steep hill, when he might quite easily have thrown them into some ravine where they would be quite as useless to the Philistines as on the top of the hill. This act appeared to me to be more like that of an epileptic, who runs straight on without either knowing or caring where he is going, than that of a sensible man; and the greater part of Samson's acts were rather exhibitions of blind fury than of the wisdom of a judge. Samson's achievements recall those of the Scandinavian hero Berserker, who entered into the battle with nothing on but his "bare sark" or shirt only, but in a state of fury which seemed to serve him in place of armour. This

fury was no doubt imitated by many of his followers, so that his name has now become attached to it as an adjective. How it was brought on I do not know, but it seems closely allied in its nature to that which the Malays induce by *hasheesh* before they run amok.

Migraine.—Many authorities regard epilepsy and one-sided headache, or migraine, as closely associated conditions([11]); and epilepsy is supposed by some to depend upon a spasmodic contraction of some of the blood-vessels in the brain. Du Bois Reymond, who suffered much from migraine himself, ascribed it to spasmodic contraction of blood-vessels in his head, for he found in his own case that during the attack his temporal artery (*vide* Figs. 7—9) became tense and hard like a bit of whipcord, and the pupil of the corresponding eye dilated as if the sympathetic nerve in the neck had been stimulated. Others, again, have held, also on the ground of personal experience, that the blood-vessels were widely dilated. Observations that I have made on my own head show that both these ideas are right, for I find that the condition is really one of peripheral contraction and approximal dilatation ; *i. e.* those parts of an artery which are nearest the heart expand widely, whilst those which are farthest away contract tightly. The carotid artery dilates widely and throbs violently, but the temporal artery is usually contracted as in Du Bois Reymond's case. Sometimes, however, the dilatation extends even to the temporal artery, so that it is dilated and throbbing while the headache is just as severe as when it is contracted and hard. On such occasions, if I pass my finger far enough along the artery, I always find a spot where the contraction begins, and usually the branch (*vide* Fig. 8) which ascends up the frontal bone feels like a bit of piano wire under the finger, while the artery as it crosses the temple is soft, dilated, and pulsating. Occasionally the vascular condition at the temples seems suddenly to become normal, and the pain is transferred to the back of the head, and—what is sometimes more extraordinary—the pain may leave the head altogether quite suddenly and commence in the abdomen, or *vice-versâ*. There is evidently a close connection between the abdomen and the head, and one of the commonest terminations of migraine is violent vomiting. The pain of migraine is frequently accompanied by other phenomena, which are readily explicable on the hypothesis

that those branches of the carotid artery which pass to the interior of the skull are affected in the same way as those

FIG. 7.

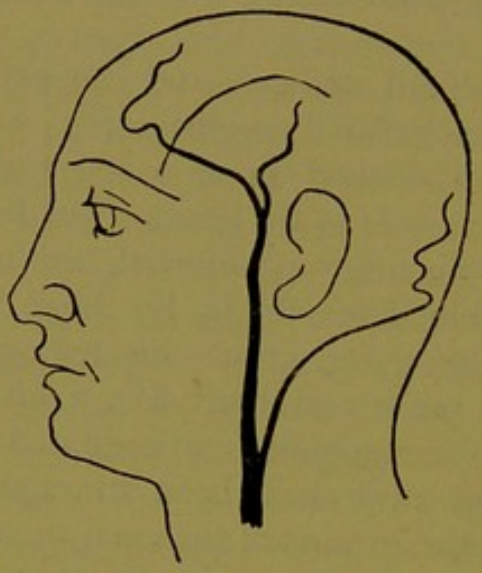

Diagram of the carotid, temporal, and occipital arteries in the normal state.

FIG. 8.

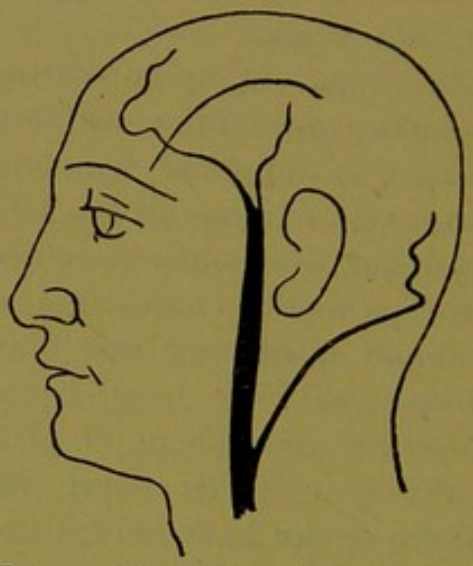

Diagram of arteries during migraine, showing dilatation of the carotid and spasmodic contractions of the temporal arteries.

which pass to its outside. If the terminal branches of the temporo-sphenoidal artery (Pl. II, fig. 1) become contracted like

FIG. 9.

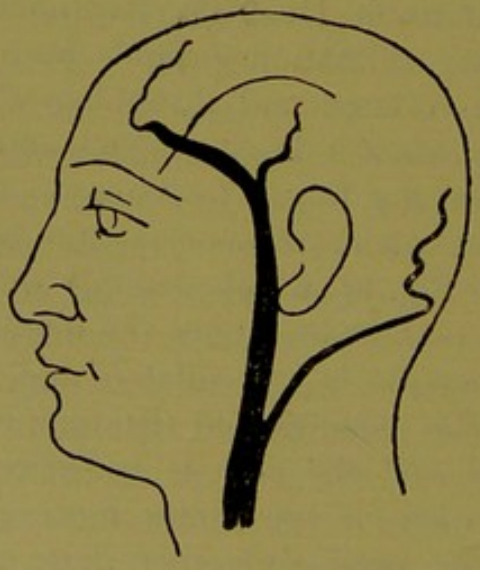

Diagram of arteries during migraine, showing dilatation of the carotid and temporal arteries, and spasmodic contraction of an ascending frontal branch of the anterior temporal artery.

a bit of piano wire, as the one which runs up my forehead does during a headache, the nutrition of the centre for sight in the

FIG. 1.—Distribution of the arteries in the brain. (After Ross.)

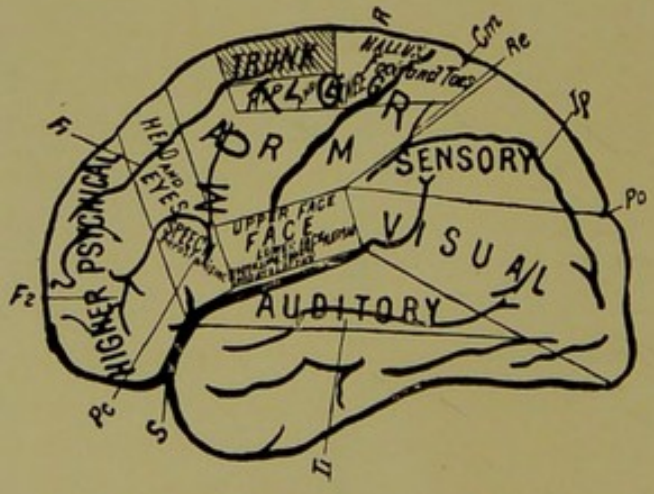

FIG 2.—Cerebral cortex showing the distribution of function. (After Osler.)

To illustrate Sir LAUDER BRUNTON's paper.

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brain must necessarily be impaired; and if the spasm should extend farther down the artery to 5, the centres for hearing, taste, and smell will also suffer (Pl. II, fig. 2). I think it is probable that such impairment is the cause of the indistinct vision of the hemiopia, *i.e.* blindness to all objects on one side of the body, either to right or left, even of complete blindness, and of the zigzags which occur either before or during an attack of migraine. The senses of taste and smell are less frequently affected, but I have one case in which the patient has neither taste nor smell during the attack of headache, and after it is over both taste and smell return quite suddenly. In this patient there is no disturbance of vision, nor is there any aphasia during the attack. In other cases one finds aphasia to a greater or less extent present during the attack, and passing off when it is over.

To some the idea may seem far-fetched, but I am inclined to believe that the fairies which many people declared that they saw were nothing more than the coloured zigzags of migraine modified by imagination, and in some cases, perhaps, accompanied by, and to some extent occasioned by, an abnormal condition of one or other eye. It is quite extraordinary to notice in the stories of fairies how often the "seer" was struck blind of one or other eye, and after this his power of seeing fairies disappeared. When I was a small child, my aunt's maid told me that she had seen fairies when she was a little girl living in Earlston, the home of Thomas the Rhymer, and the centre of fairyland. She was standing one morning at the door of her house, when she saw a troop of small people dressed in green coming up the street. She called to her father and mother to look at them, but neither of them could see anything. A few years ago I got her to give me a written description of this occurrence, and I took it with me to a meeting of the British Medical Association at Portsmouth, where I read a paper on "Headaches." Since then I have laid it aside so carefully that I cannot find it, and consequently am unable to quote it *verbatim*. In his address at the British Association, Professor Rhys said that he considered the stories of fairies to be founded upon the existence of a small degenerate race. It is with the utmost diffidence that I dissent from so great an authority, but it seems to me that whilst the stories of brownies, *i.e.* the small supernatural household

drudges of farmhouses in Scotland, may very well depend upon the existence of a few remnants of a degraded and degenerate race, yet some stories of the fairies belong to an entirely different class, although in others the character is mixed. In Scotland the fairies and the brownies are entirely different beings, but in Wales and Ireland they seem less sharply differentiated. It is noticeable that visions of the fairies, or little green folk, are very generally accompanied by jingling of bells, and this I regard as stimulation of the nerve-centres for hearing coincidently with that of the visual centres. The relation of the appearance of fairies and that of the Waldmädchen to epileptic states is, I think, indicated by the person who saw the fairies, like the man who saw the Waldmädchen, being carried off for a time, which seemed to him years, into some supernatural country, on his return from which he found himself exactly at the spot whence he had gone. It is, moreover, just between sleeping and waking condition that epilepsy so frequently occurs, and as Scott says,—

> 'Twas between the dawning and the day,
> When the fairy king hath power,
> That I fell down in sinful fray,
> And 'twixt life and death was snatched away
> To the joyless elfin bower.

It may be incidentally remarked that Gustave Doré's pictures of long lines of people, as, for example, in his picture of Paola da Malatesta and Francesca di Rimini in his *Inferno*, have a striking similarity in form to the zigzags seen in sick headache (*cf.* Plate III, figs. 1 and 2, with Plate IV); whilst Dante himself appears to have seen something of this kind, for in his *Paradiso*, canto xviii, lines 70—72, he says, "So, within the lights the saintly creatures flying, sang, and made now D, now I, now L, figured in the air." Sick headaches are, perhaps, more frequent amongst highly sensitive members of civilised communities, but it is probable that they have existed at all times and amongst all peoples, and wherever they have been present they may have led to visions. Numerous examples have been found of skulls belonging to the Stone Age in which large holes have been bored with stone implements, and the patient has not only recovered, but has lived for a long time after the operation. This is shown by the edges of the

FIG. 1.—Dante and Virgil watching Paola da Malatesta and Francesca di Rimini in the procession of spirits. (From Doré's *Inferno*, by kind permission of Messrs. Cassell and Co., Ltd.)

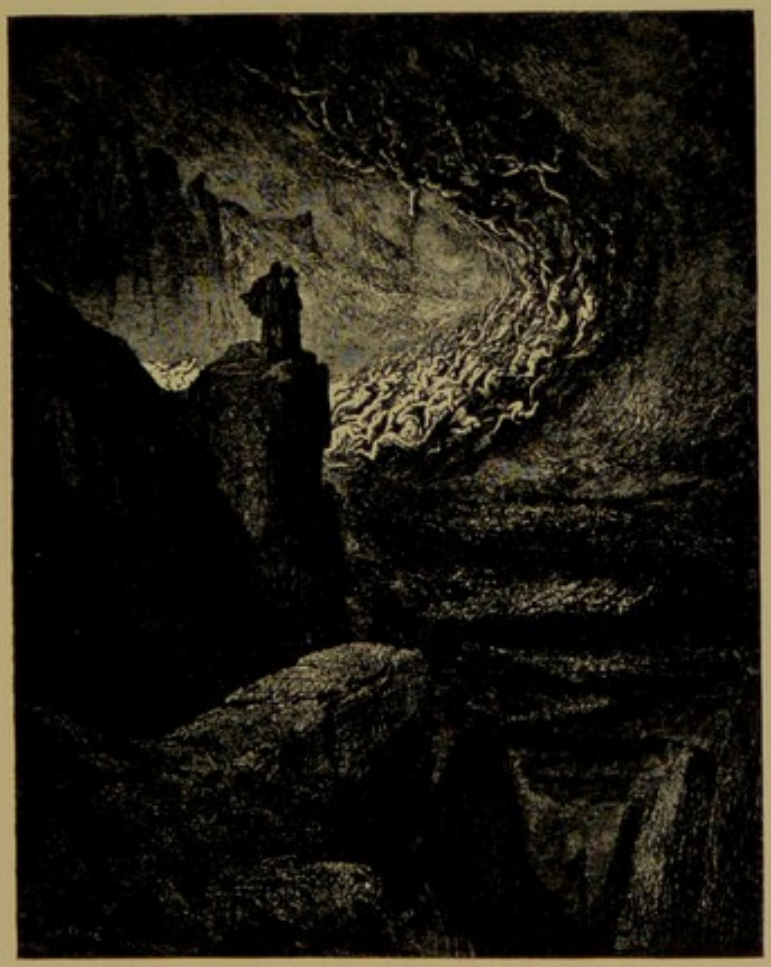
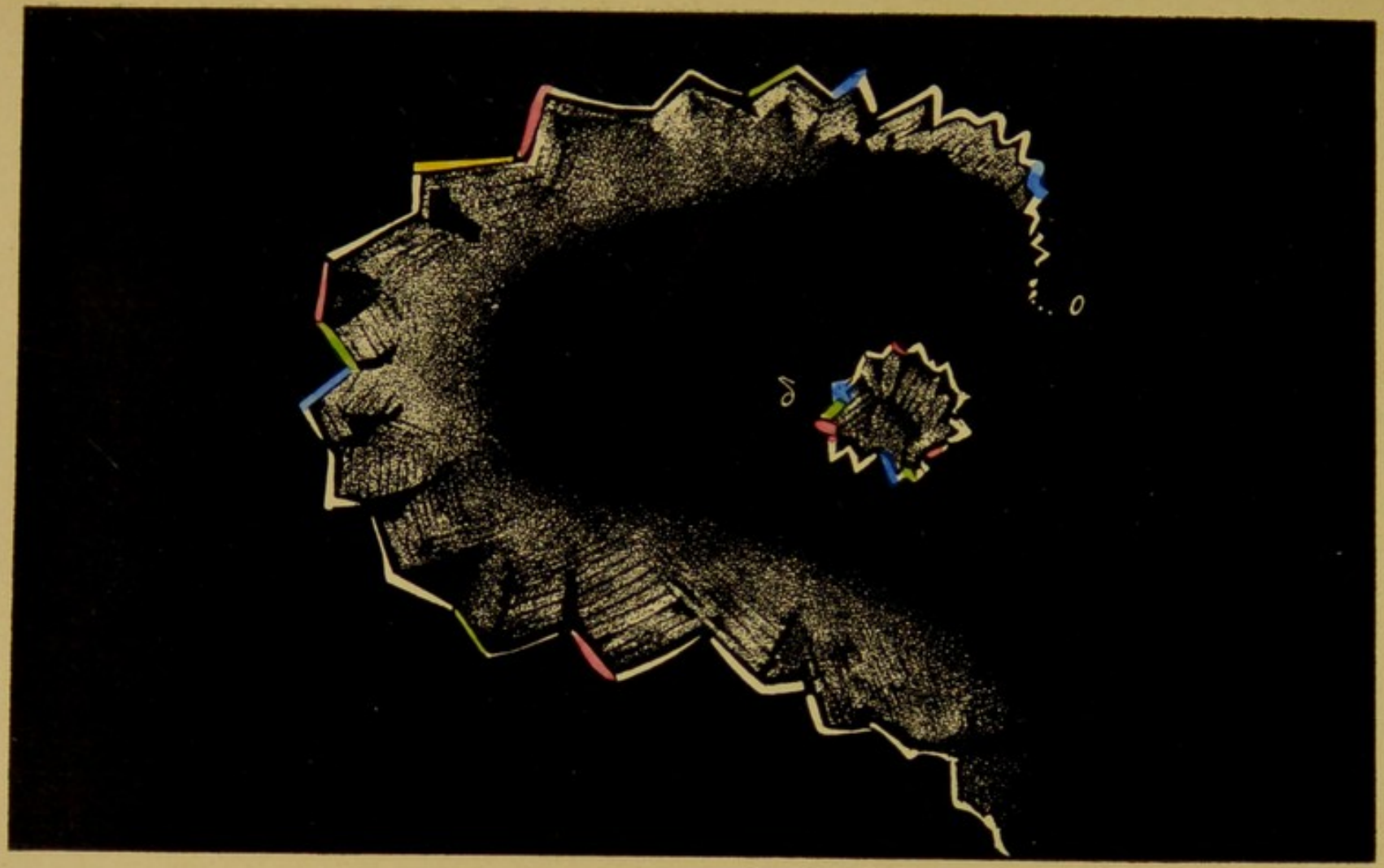


FIG. 2.—Procession of spirits taking the form of a D. (From Doré's *Paradiso*, by kind permission of Messrs. Cassell and Co., Ltd.)

To illustrate Sir LAUDER BRUNTON'S paper.



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Visual appearance which sometimes precedes a sick headache.

After HUBERT AIRY.

To illustrate Sir LAUDER BRUNTON's paper.

bone not being sharp or rough, as they would be for some time after the operation, but smooth and bevelled by slow absorption after the wound had healed.[12] Some authorities have supposed that these openings in the skull have been made for purposes of priestcraft, and that the priests, by pressing hard on the brain through the opening in the skull, were able to induce epileptic fits in the patient, and then announce that he was possessed by a spirit, and in a fit condition to give oracular responses. It is possible that the openings in the skulls may have subserved this purpose, but to any sufferer from sick headache the first idea that suggests itself is that the holes were made at the request of the sufferers in order to "let the headache out," for when the pain of headache becomes almost unbearably severe, an instinctive desire sometimes arises either to strike the place violently in the hope of relieving the pain, or to wish that some operation could be done to remove the pain ; and some of the South Sea Islanders actually make a hole in the skull for this purpose.[13]

Perhaps the hallucinations that are of the most practical importance are those of hearing, where patients are told by voices inaudible to others that they must do certain things, sometimes of the most gruesome nature, and their obedience to such voices may lead them to commit the most horrible crimes. In the case of the inmates of a lunatic asylum, the dangers which might arise from any such hallucinations of hearing can be carefully guarded against ; but when persons, otherwise apparently perfectly sane, are subject to them, the risk which they may cause is considerable. Sometimes such hallucinations of hearing may be beneficial instead of harmful, the individual being told to do certain things which are right and proper. In some cases such hallucinations appear to have had the most wide-reaching effect—as, for example, in the case of Mohammed, who began dating his mission as the "prophet of God" from a vision of an angel who spoke to him and announced his prophetic mission. The attack in which this occurred appears to have been curious, because it began with a flood of light succeeded by unconsciousness, after which the vision was seen. It occurred in the night, so that no one was able to say whether the vision was accompanied by any convulsion ; but he was liable to attacks of definite epilepsy, so that his biographer says that "he would be seized with a violent trembling, followed by a

kind of swoon, or rather convulsion, during which perspiration streamed from his forehead in the coldest weather ; he would lie with his eyes closed, foaming at the mouth and bellowing like a camel." It is curious to speculate what the fate of the world might have been if bromide of potassium had been known in the days of Mohammed, for the free use of this substance might not only have checked his fits, but removed the visions by which they were accompanied. In sick headache, as in epilepsy, bromide of potassium is very useful. I find that a combination of it with salicylate of soda is more useful still, and forms a very efficient remedy both for the prevention and arrest of the migraine. Numerous other drugs, such as caffeine, antipyrine, phenacetine, arrest headaches. All the mental faculties are no doubt greatly modified by the condition of the intestines, and everybody knows that headaches are apt to be produced by constipation ; while an attack of migraine may often be warded off by a blue pill and a black draught.

All the phenomena I have been describing of the most part are of a morbid nature. It is quite true that some of the most remarkable men in the world's history have been epileptics, but I do not think that Julius Cæsar, Napoleon, or Mohammed were great because they were epileptics. As a rule, epilepsy tends to destroy mental power rather than to increase it, and the curious lethargy which Napoleon exhibited at the Battle of Leipzig, and which there led to his defeat and consequent ruin, is probably rather to be ascribed to his epileptic tendency than to the indigestible bun which is said to have led to the disaster. Julius Cæsar and Napoleon were great men, not because of their epilepsy, but in spite of it ; and the visions of Mohammed alone would not have given him his extraordinary power over his countrymen and over the then known world had it not been that they were backed up by extraordinary mental power and energy in the intervals between his fits. It is only since the main part of this paper was written that I have become aware that the views I have expressed regarding Samson and Mohammed are considered by some not only irreligious in themselves but calculated to wound the religious feelings of others. Nothing could be further from my intention. The part played in the history of the nations or in the history of the world by these two men is altogether unaffected by the question

whether they were subject to nervous disease or not. The point in question is simply *how* the great Ruler of All has been pleased to produce certain effects, and no more concerns the question of His rulership than a discussion as to whether the *Koran* was written on the blade-bones of a sheep or on the finest vellum, or whether the *Marseillaise* was written with a steel or quill pen. Instead of such an investigation being irreligious, it seems to me that research is clearly indicated as a duty by the words in Psalm cxi, 2, "The works of the Lord are great, sought out of all them that have pleasure therein."

(1) Read at the General Meeting of the Medico-Psychological Association, November 21st, 1901.—(2) For definitions, *vide* Baldwin's *Dictionary of Philosophy and Psychology*. Macmillan: New York and London, 1901.—(3) Davey, "Transference of Special Sense," *Journal of Physiological Medicine and Mental Pathology*, vol. vii, part 1.—(4) Hooper's *Physician's Vade Mecum*, 7th edit., p. 115. Edited by Wm. Augustus Guy and John Harley. London, 1864.—(5) *Munsey's Magazine*, Nov., 1901, p. 216.—(6) "Inhibition, Central and Peripheral," 'West Riding Asylum Reports,' *Nature*, xxvii, 1883, pp. 419—422, 436—439, 467, 468, 485—487.—(7) Weir Mitchell, "The Relations of Pain to Weather," *Amer. Journ. of Med. Sci.*, April, 1877.—(8) Tatham Thompson.—(9) H. Head, Goulstonian Lecture for 1901, *Brain*, part iii (1901), p. 352. Macmillan: London and New York.—(10) E. H. Clarke, *Visions: a Study of False Sight*. Houghton, Osgood, and Co.: Boston, 1878.—(11) *Vide* especially Hughlings Jackson, *Lancet*, Aug. 14, 1875, etc.—(12) Lucas-Championnière, *Étude historique et clinique sur la Trépanation du Crâne: la Trépanation guidée par les Localisations cérébrales*, p. 2. Paris, 1878.—(13) Lucas-Championnière, *op. cit.*, p. 6.

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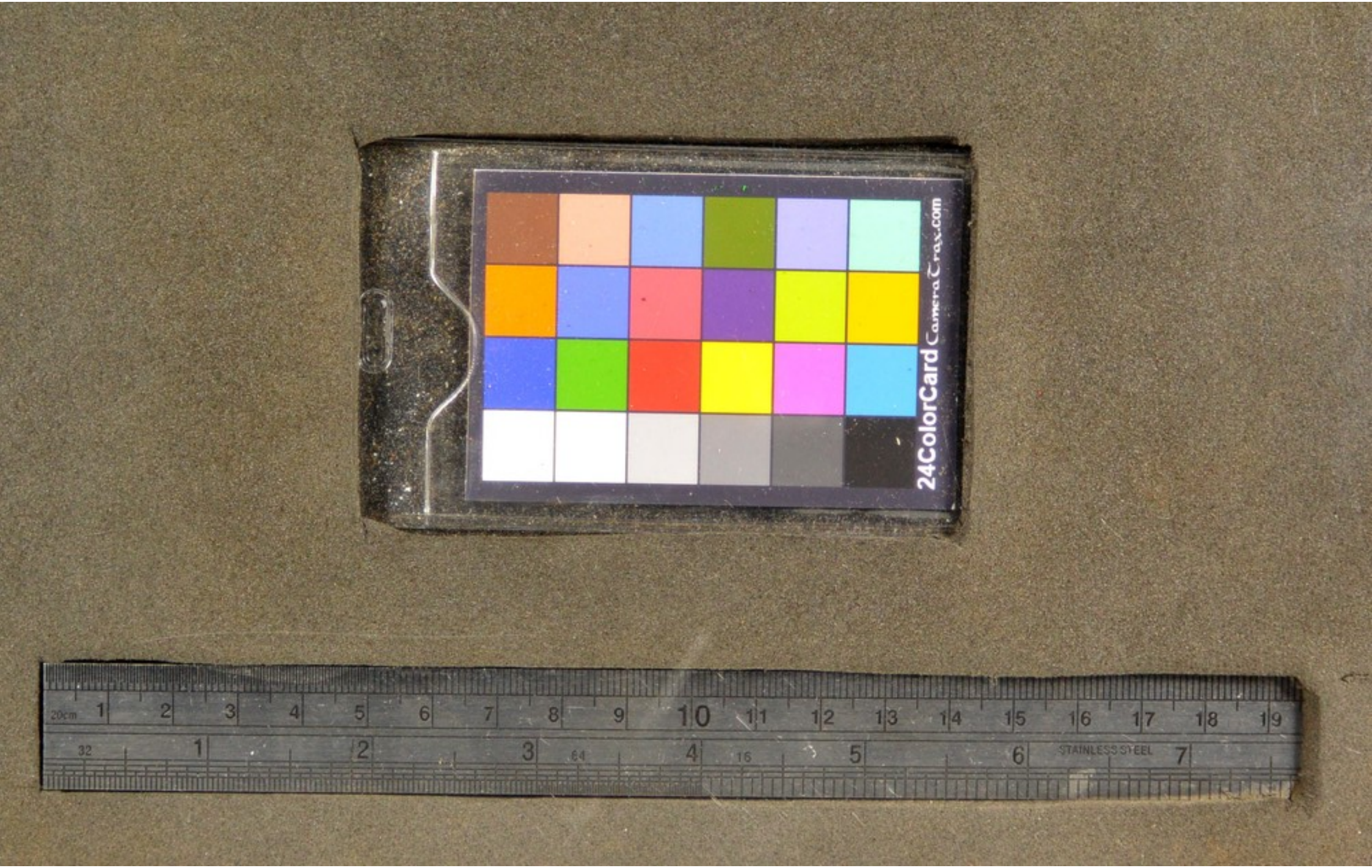
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