

on the way to hypnosis or to sleep. On another occasion he actually fell into hypnosis not being able to move his eyelids or his arms and even took various suggestions. After a few minutes he ceased to be in communication with me and when suggestions were given to him as they had been given to him before, he did not take them, but woke up when loudly spoken to. In other words he fell asleep, and the loud voice disturbed his sleep.

Boy of fourteen; he had difficulty in going to sleep under the conditions of monotony and limitation, but when these conditions were long continued, he finally went into the hypnoidal state. As I feared to disturb him by too much questioning I left him without change to his monotonous environment. After about a quarter of an hour he was fast asleep, snoring in the chair.

Thus we find that in infants and children, as in the lower animals, sleep, hypnosis, and hypnoidal states are intimately related, sleep presenting complex manifestations of subconscious states which become fully developed in the adult.

(To be concluded)

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COLORED THINKING

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IF I were to ask at random some one of my acquaintances the simple question: "what color is Saturday to you?" he would probably reply that the question, if not a very bad joke, was perfectly meaningless or he would assert with manifest confidence that it was and always had been, white or black or red or green or yellow or blue.

It is a matter of sober fact that there is a small minority of people perfectly healthy in body and mind who cannot visualize anything without its being present to them in some sort of color or other. In plain language, this might be called colored thinking, to the learned it is known as psychochromaesthesia. The colored thing in the mind or the colored concept is therefore a psychochrome, and a person who habitually thinks in this way is a psychochromasthete or simply a "seer," as Mr. Francis Galton has suggested. Seers are psychological curiosities and psychological problems; such persons cannot think of the name of a day of the week, for example, without seeing it in color; so that, in the cases of four different people within my knowledge, Monday is always thought of as yellow, grey, blue and green respectively.

Chromatic conception must be sharply distinguished from chromatic sensation.

It is not for our present purpose necessary to go fully into the differences which psychologists affirm between a sensation and a concept. It may be sufficient to say that of the two the former, the presentation of sense, is the more simple, concrete, elementary and always involves the activity of a sense-organ, whereas the concept is the complex, abstract and non-elementary result of the action of mental synthesis.

Sensations, sights, sounds, touches, pressures, pains, odors, tastes, etc., are information-bringing results in consciousness of contact with the outer world, whereas conception is the technical term for "thinking about" anything, a sensation included.

When I think about the name of the month January — the name or word appears to me reddish, April is white, May yellow, the vowel *i* is always black, the letter *c* white, *r* is indigo blue, and *w* very dark purple.

Only by a determined conscious effort can I think of *b* as green or blue, for to me it must be, always is, black; to imagine August as anything but white seems to me an impossibility. There is an inherent definiteness, finality, constancy about each individual's psychochromes which is very striking.

Allied to this, but psychologically different, is the linking of one kind of sensation to another kind of sensation in some invariable and instantaneous association. Thus certain persons, when they hear a particular tone on the organ or violin or sung by a tenor or contralto voice, seem to hear it violet, if we may use such an expression, the actual sound of this particular tone arouses the mental picturing of violet. A certain French gentleman always *heard*, not merely thought of, the sound of the vowel *i* as green. These associations between two different varieties or modes of sensation are known as synaesthesiae.

Conversely a color can call up a sound, as in the classical case of John Locke's blind man to whom "scarlet" was like "the sound of a trumpet"; this is the earliest example of synaesthesia in literature that I know of.

Synaesthesiae are then such coupled sensations as colored sounds, colored tastes, colored odors, or in general any invariable linking together of two different varieties of sensation.

Two well-marked cases of synaesthesiae are described in his "Problems of Life and Mind" by the late Mr. George Henry Lewes — well known as the first husband of "George Eliot." Two brothers of the name of Nussbaumer experienced invariable associations between sounds and colors. Voices and certain musical tones aroused particular colors, and conversely certain colors always called up the same sounds. Blue, yellow, brown, violet were the colors oftenest aroused; black, white, red and green were never experienced.

Both the brothers experienced the same chromatic associations with sounds in more cases than they had dif-

ferent ones. Even in their dreams, dual sensations were present; thus a loud noise, beat of drum for instance, evoked in their dreams the same color to which it would have given rise had it been in the waking state.

Associations between hearing and the sense of color (chromaesthesia) are the commonest of synaesthesiae; in this country we call it "colored hearing," the French name it "L'audition colorée."

Quite a number of cases of this are to be found throughout the various psychological, physiological, and psychophysiological journals; more cases indeed than one unversed in such matters would imagine. To take a typical case of it analyzed by Professor Albertoni of Bologna in 1889: the hearing of *do* (*c*) was always associated with blue, *mi* (*e*) with yellow, *sol* (*g*) with red. This then was typical colored hearing, a synaesthesia, the auditory sensation of *c*, or *e* or *g* produced simultaneously the sensation of blue, yellow or red, respectively. But much more psychologically remarkable is the state of two persons who were red-blind, color-blind to red; who had what we here call "Daltonism," because the great English chemist Dalton was one of the first to describe the inability to perceive red and distinguish it, for instance, from green.

It was found that these red-blind people could not correctly name the note *g*; that is, could not recognize the tone which certain other persons had associated with red. Albertoni, writing in German, called this condition "Gehör-daltonismus" or *Daltonismus auditivus* or auditory Daltonism. It was a psychical deafness depending on red-blindness.

More recently Monsieur Peillaube, editor of the *Revue Philosophique*, has reported on the cases of four persons, synaesthetes, who had well-marked colored hearing for vowel-sounds and organ-notes. This author calls attention to certain cases amongst musicians of definite associations between not only notes, musical instruments and colors, but between whole pieces of music and colors. Gounod, endeavoring to express the difference between the two languages, French and Italian, and giving his preference for the former, used the language of colors,

"Elle est moins riche de coloris, soit, mais elle est plus variée et plus fines de tintes."

But reports of such things as coupled sensations and psychochromaesthesia are not confined to the dry archives of severe science. In the recent psychologically interesting novel "In Subjection"* by the gifted writer Ellen Thornycroft Fowler (Mrs. A. L. Felkin) there is more than a passing allusion to colored thinking.

The chief character in the book, Isabel Seaton, is described in chapter X as always having been the percipient of psychochromes. She says that to her, *a, e, i, o* and *u* have in thought the colors green, blue, white, orange and purple, respectively. Even *w* and *y* are not left out in the uncolored cold, for *w* is red and *y* yellow.

Of this character it is further said that "ever since she can remember," the days of the week have always been associated with colors as follow: Monday green, Tuesday pink, Wednesday blue, Thursday brown, Friday purple, Saturday yellow and Sunday white.

In a private communication, Mrs. A. L. Felkin was good enough to inform me that in her mind the odd numbers have the "cold colors"—grey, black, blue, green,—and the even numbers the "warm colors"—red, yellow, brown, pink, purple and orange.

People well known to this authoress are also constantly associated with certain colors which have nothing at all to do with the colors most frequently worn by them.

Nor is this all; to Mrs. A. L. Felkin a soprano voice is pale blue, green, yellow or white; a contralto pink, red, or violet; a tenor different shades of brown; basses black dark green or navy blue.¹

These latter concepts are the only ones where each is not associated with one particular color; for a definiteness in the color called up and this invariableness of association are two strikingly constant characteristics of colored thinking.

The case of Isabel Seaton is, then, one of pure psycho-

*Hutchison & Co., Paternoster Row, London, 1906.

¹ For colors associated with the voices of well-known singers cf. B. Lumley's "Reminiscences" (1864).

chromaesthesia (chromatic conception) and of synaesthesia too, for the sounds of singing voices arouse colors as just detailed. I, on the other hand, have no synaesthesia, only psychochromaesthesia; thus no sound, either of a voice or anything else calls up in my mind a color or any other sensation, but the moment that I think intently and so visualise the word "*soprano*," I see it written in white, the word "*tenor*" in brown, the word "*bass*" in black.

Now it seems evident that only those persons who tend to visualise, project outwards ("exteriorise") their thoughts (concepts) will be at all likely to experience colored thinking, that is, to be psychochromasthetes; at any rate people differ widely in the facility with which they can visualise their mental images, some persons having a very feeble power of seeing things before "the mind's eye," others not being able to think of anything clearly until it is projected outwards.

Thus long ago Mr. Francis Galton in his "Inquiries into Human Faculty and its Development" (1883) came to the conclusion that in connection with this power of mentation, one could divide people up into "poor visuals" and "strong visuals" as regards either the presence of an object in thought or the memory of it. Some people, it is well known, can remember how to spell a particular word only when they see it written out before them, and are greatly helped by the "look" of the word—not its sound. Analogously, other people recall an event in history, for instance, by calling up before their mind the very page and place on the page in the book in which they first read of the incident; they are strong visuals.

Others again always think of the numerals as written out in space before them or above them: one distinguished neurologist of my acquaintance figures the numerals from 1 to 100 in the form of a ladder sloping up from left to right into the sky. Naturally these must have *some* chromatic character, meaning by "chromatic" white and black and grey as included amongst "colors."

These exteriorized thoughts may be called psychograms; things, as it were, written in or by the mind with a degree of distinctness beyond what is believed to be normal for the

majority of mankind. When these psychograms of numerals, letters, etc. are also seen colored as though produced by the sun shining through stained glass, they may be called either chromopsychograms or simply psychochromes, as Mr. Galton originally suggested. Mr. Galton in the appendix to his book gives some typical colored concepts and colored exteriorised thoughts; very peculiar looking diagrams they are, reminding us of Joseph's "coat-of-many-colors" or of Jacob's ladder treated chromatically.

What manner of people, it may be asked, are they who have synaesthesiae or psychochromaesthesia?

Mr. Galton is again the authority here; he says that "seers" are to be found amongst both men and women, and that "they are rather above than below the intellectual average"—truly a comfortable doctrine for those who are seers, to whom therefore the word psychochromaesthesia is almost as "blessed" as Mesopotamia. I have not been so fortunate as Mr. Galton in meeting with many people who were colored thinkers; the majority of those whom I have questioned on the subject were either incapable of understanding what was meant by chromatic conception or were disposed to treat the whole subject more in the spirit of hilarity than in that of introspection. Possibly some few who are true psychochromaesthetes shrink from confessing the fact under the impression that if it is not something to be ashamed of, it is at any rate a childish survival. In all probability, if an adequate study could be made of childish survivals into adult life, a very great deal of interest and instruction would arise for empirical psychology.

It must not be imagined that those who are colored thinkers are constantly plagued with vivid day-dreams or colored phantasmagoria; they are not the victims of visual hallucination. It is true that colored conception consists in the invariable association of a particular color with the notion or idea of a particular thing. When I think of "one hundred," the letters constituting these two words seem to me vaguely written out somewhere in dark brown ("Vandyck Brown" of paint-boxes). I could not if I chose think of 100 in pink or white; the whole idea of a hundred is to me essentially and unalterably a dark one.

Similarly with the hours of the day, since ever I learned to "read the clock," I have thought of the hours of the day and night as having color. Thus to me the hours P.M. are 1 brown, 2 yellow, 3 white, 4 black, 5 brown, 6 white, 7 magenta red, 8 black, 9 yellow, 10 black, 11 green and 12 yellow. I am incapable of thinking without a very decided effort of 2 P.M. and 9 P.M. as anything but yellow, or 10 P.M. as anything but black; it seems absolutely unnatural to me that 3 P.M. and 6 P.M. should be anything but white. But I am not incommoded by these chromatic associations, they do not obtrude themselves into my mental life, they are there as habitual, natural tincturings of my ideas; for, more or less distinctly, every word has for me a chromatic property.

All words seem capable of being divided up into:—

(1) the dark, and (2) the light, the former predominating.

Random examples of dark words are:—

Of nouns (concrete): man, tree, hill, book, night, horse, train, Rome, London.

Of nouns (abstract): duty, ruggedness, violence.

Of verbs: to die, to know, to rest, to walk, to ride.

Of adjectives: awful, diseased, wicked, evil, horrible, ready, dark.

Random examples of light words are:—

Of nouns (concrete): sea, child, silver, year, face, day, cart, Stockholm, Cairo.

Of nouns (abstract): sameness, haste, consciousness.

Of verbs: to cry, to scream, to sit, to swim, to teach.

Of adjectives: sweet, gracious, stupid, simple, shrewd, ghostly, sinful.

Of course certain words in which color is expressed or which name an object of a definite familiar color, are colored appropriately. The psychochrome of scarlet is scarlet; of white, white; of black, black; purple, purple; and so on.

Similarly the words "lily-of-the-valley" are white, and a "snowdrop" is white, but the word "crocus" is to me also white—although the flower is more often seen yellow than of any other color. Again the word "rose" is neither white nor bright red, but of a decidedly dark red as though

seen in feeble light. It is almost always the word and not the object which I "objectify." The word "grass" is not to me of the vivid green of grass as we know it in Britain, but of a much less saturated green, a grey-green. Again "Mr. Brown" does not call up before my mind the brown as of a bear's fur, but darker — almost black-brown. The word moon is white, sun is yellow, and stars white.

All this seems supremely arbitrary if not also meaningless, and the "explanation" of it very difficult to find. But coupled sensations or colored concepts are as much natural phenomena as the rising of the sun or the closing of a daisy. If we knew everything, Nature would have no difficulties and it would have no mysteries. Later on when we have learned all we can about the facts of this subject, we shall attempt an explanation; in the meantime there is more that we can find out by a survey of as many cases as we can bring together for comparison.

It was Mr. Francis Galton who, by comparing as large a number of psychochromes as possible, first enumerated for us the four or five characteristics of chromatic conception. The examination of such cases as I have been able to make and the introspection of my own experiences lead me to agree with Mr. Galton's analysis in every particular.

1. First, these associations between concepts and colors have been formed at a very early age. Mr. Galton's correspondents wrote: "Ever since childhood I have always seen," "as far back as I can remember I have always seen," and so forth. In my own case I believe that some of the psychochromes for hours of the day were fixed when I was five years old, and one of my nephews before he was seven had definite associations between colors and days of the week. In "Nature" for 1891 (Volume 44, p. 223) Mr. E. S. Holden reports on the psychochromes of his daughter when aged seven, at which time she had specific colors for the days of the week.

2. The next point which may be said to be a characteristic of psychochromes is their distinct individuality. The color I associate with the vowel *u* is the kind called "French grey," but it is yellow to one seer, black to a second, brown to a third, blue to a fourth, and green to a fifth.

These are quoted from tables of colored concepts compiled by me in 1905.* There is nothing like even a general agreement between the colors attached to the same concepts in the minds of seers. The one exception is when seers are members of the same family, but even in this case their psychochromes are not invariably the same. Nothing strikes me so forcibly on looking over lists of psychochromes as the endless variety of colors attached to the same concept. What is it that makes one person always think of August as white, another as yellow-brown, still another as crimson? The month of white harvest will not account for it, for the same person who thinks August white also thinks February, a month of no harvest, white. Again, if August is a white harvest month to any one person, it must be such to all persons capable of receiving any impressions from Nature at all, and yet some people see it brown and others crimson. The mystery deepens.

3. The third characteristic of psychochromes is their extreme definiteness in the minds of seers. It might be thought that colors attached to things so intangible as concepts would be vague, indefinite, hazy: as a matter of fact it is exactly the reverse.

The psychochromaesthete is not content with saying that, for instance, Sunday is yellow, he says it is "a very pale canary yellow." Another seer I know says that September is "steel grey," not merely grey. Some one else distinguishes between white and grey, between a bright white, a dull white, a silvery white, and so on. One French seer of whom I have records thinks the vowel "e" is grey-blue, another sees "s" as lemon-yellow not any other tint of yellow.

The degree of chromatic precision which can be given by seers to the description of their visualisings is surprising, as surprising as anything else in this most curious subject.

It is interesting that though so definite, these psychochromes never become hallucinations of the sane. Psychologically this is what is to be expected, because the hallucination is an exteriorised sensation produced without any

* On Psychochromaesthesia and Certain Synaesthesiae. *Edinburgh Medical Journal*, Dec. 1905.

adequate external cause, whereas the psychochrome is not a sensation at all but a concept.

Now sensations can be the bases of illusions and hallucinations in that they are related to environmental conditions, but a concept being wholly and always subjective cannot be the source of a hallucination: a hallucinatory concept is psychologically meaningless. A sensation can be the source of an error of judgment as to its origin in the environment, but a concept has no reference to the environment at all. This is probably a great part of the reason why these psychochromes never rise to the level of the vividness of a hallucination: they have all the definiteness of a thought without any of the verisimilitude of a subjective sensation.

4. The fourth distinguishing feature in psychochromesthesia is that this mental faculty is hereditary, "very hereditary," as Mr. Galton puts it. In quite the majority of cases the power, if it may be so called, of thinking things colored has been innate, parents or remote ancestors having also possessed it.

We shall later revert to this point as it is theoretically important: if the faculty of colored thinking is parentally-derived, it is not also environmentally-produced. The importance of this will become evident later when we attempt to theorise on the condition.

The same seems true of synaesthesia: one of the latest French papers which I have seen is entitled: "Cas d'audition colorée hallucinatoire; cas héréditaire." And again, I have a reference to another paper emanating from France with the title: "Un cas héréditaire d'audition colorée."

A father, son and daughter, each associated the hearing of the names and also the thoughts of letters of the alphabet with definite colors, the vowels with gay colors, the consonants with shades of grey. The condition was hereditary in the second generation, and the idiosyncratic characteristic was also not wanting, for the father and son had different colors for the sound or thought of the same vowel.

The hereditary character so insisted on by Mr. Galton, I find wanting in one or two cases that have come under my notice. Mr. E. Holden (*Nature*, 1891, Vol. 44, p. 223),

the father of the child with such definite psychochromes, was himself perfectly unable to visualise numerals or anything else. By accident he discovered that his daughter was a seer. I can trace no hereditary influence in my own case, but one of my brothers and a boy of his think chromatically.

5. Lastly we have the characteristics of the unchangeableness of these colored concepts throughout life. It is the almost universal confession that they appear to the percipient now as they have always appeared; that they have undergone no changes during a life-time otherwise full of changes.

As for my own, I have known no change in them for thirty years, and my brother's experience is the same. On this point Mr. Galton remarks: "they are very little altered by the accidents of education."

Just as apparently their origination is not due to the influence of the environment, so the environment exercises no modifying influence over them as life proceeds: in other words they are unrelated to the environment. Even to this apparently universal law there is an exception, at least in the case of the child Holden, whose psychochromes altered as she grew older; but even this does not prove that the environment altered them. Mr. E. S. Holden reported on the changes of his daughter's psychochromes at 7, 8, 10½, 13, 14½ and 16½ years of age. But on scrutinising the tables, the amount and nature of change is quite insignificant; thus, the numeral 9 was green in 1885, blue in 1887, blue-green in 1889 and finally dark-blue in 1891. None of the other changes is of much more consequence. At 13 years old she thought of Friday as white, but later as cream-colored. Strictly speaking Miss Holden is not an exception to any of the outstanding features of a typical case of psychochromesthesia.

Can we get any intelligible explanation or working theory of this extremely peculiar but not extremely rare condition? Does it seem capable of explanation by any of the theories of color-vision known to physiology?

Has it any obvious relation to the primary colors of the Young-Helmholtz theory,— red, green, blue-violet—or to

those of Hering's theory red and green, yellow and blue?

The answer to all these questions is in the negative. The total number of colors associated with concepts is perhaps not large, the following are the colors reported:—

(1) Those in the spectrum, viz. red, orange, yellow, green, blue and violet, and (2) those not in the spectrum—white, black, grey (including all the varieties of grey), scarlet, cream, brown (with all the shades of brown), crimson, pink and purple.

The commonest chromatic conceptions seem to be white and brown, each occurring 23 or 24 times out of 100 psychochromes taken at random from those of four people, two men, one woman and one child. The rarest two colors associated seem to be orange and purple, they occur but once each in a 100 cases. I have analyzed 100 psychochromes of four persons to whom they belonged in the following proportions: 31, 31, 18 and 20 respectively. White constituted 24%, brown 24%, black 17%, yellow 11%, green 7%, blue 5%, red 4%, pink 3%, cream 3%, orange 1%, purple 1%. These figures do not show the colors as related more to one color-theory than the other; the primaries of the one would explain the occurrence of the colors as readily as would the primaries of the other; we can get no help in this direction. There is no suggestion amongst these data that allied concepts have allied colors, no hint that if one thing is red its opposite is green, or if black its opposite is white. We do not find that if "good" is colored green "bad" is red, nor that if "beautiful" is blue, "ugly" is yellow. As a matter of fact in my own mind "fair" is colored light, and "dark" is colored dark, but "fair" is pale yellow and "dark" is mouse-brown, and these are not opposites or complementaries on any theory.

Mrs. A. L. Felkin does indeed see the even numbers as "warm" colors (red, yellow, brown, pink, purple, orange), and the odd as "cold" colors (white, grey, black, blue, green), but even this though nearer to the ideas in Hering's theory, is not in accordance with them, for white and black are placed together in the same group as cold colors, whereas Hering regards them as the conscious correlates of oppositely-phased metabolic states. In short, then, although

in psychochromaesthesia all is not the absolute chaos which on a superficial inspection it might seem to be, still if there is a method in this chromatic madness it is certainly a very concealed one.

But another line of investigation may be pursued.

Do, for instance, the colors attached to the component letters of a word constitute, when mixed, the color of the entire psychochrome? Take the word "Tuesday": it is for me white, its component letters are colored thus: *t* blue-black, *u* grey, *e* brown, *s* yellow, *d* brown, *a* white, and *y* yellow, which on synthesis could not possibly "make" white. There are endless samples of this. In my own case I can, on the other hand, find a few cases where the colors of the components do seem to contribute to the whole, thus "gay" is light yellow: *g* and *y* are yellow and *a* is white, so that white and yellow *would* constitute a light yellow. Again, the word "ghost" is white (as is natural for a supernatural existence) and its components are as follows: *g* and *s* yellow, *o* white, and *t* bluish. Now on Hering's theory these *would* give white; for the yellow and blue mechanisms being simultaneously stimulated would yield no chromatic factor in consciousness, but as white katabolises the white component of the white-black substance, white would be produced.

This may be found to be accidentally true in a few cases, but in the vast majority it is not so. For instance the word "sea" is white, but *s* is yellow, *e* is brown and *a* alone white.

The color of the concept of a word is, then, rarely the color which would be formed by compounding the real colors of the constituent letters. We have cleared the ground to a certain extent, but have derived very little material for a theory or explanation of psychochromaesthesia. The writings of Monsieur Peillaube, however, have helped in explaining at any rate some cases of these associations. Monsieur Peillaube became acquainted with a gentleman, a Monsieur Ch—, who had *audition coloree* as well as psychochromaesthesia.

Monsieur Ch—, besides having an excellent memory, was able to submit his conceptions to a searching intro-

spection with the satisfactory result that he discovered what we may call the "missing link" in his associational chain of events chromatic. To Monsieur Ch—low notes, such as the low notes of the organ, are sweet and deep (*douces et profondes*), the color violet is also *douce et profonde*, therefore Monsieur Ch—associated the color violet with low notes.

To Monsieur Ch—the vowel-sound of *i* was suggestive of something "vive et gaie," the color green had always seemed suggestive of liveliness and gaiety, therefore Monsieur Ch—always thought the vowel *i* was green. These conclusions were reached only after considerable introspective analysis working in conjunction with a very good memory, for it must be understood that the link between the low notes on the one hand and the color violet on the other—the sweetness and depth—was by no means an explicit or definite presentation in the mind of Monsieur Ch—at the time that Monsieur Peillaube first suggested to him the inquiry into the coloring of vowel-sounds or vowel-concepts.

Peillaube's theory then is that these apparently arbitrary and instantaneous linkings of colors (*x*) to sounds or concepts (*y*) are really, after all, cases of association of sensations or of concepts through the intermediation of a third factor, the emotional link (*l*), now subconscious but revivable. Thus the sequence was *x-l-y* or *y-l-x*, the *l* having long ago dropped out of consciousness, so that the *x* and *y* seem to be indissolubly bound together.

In other words, the existence in the past of some now forgotten emotional or other mental state is the causal link sought for as associating apparently so arbitrarily a color with a sound or concept. I believe that in this long past mental state we have the clue to the origin of some psychochromes at least in certain people. Some of my own illustrate this point.

The word February is to me white, the earliest February I can remember was snowy; so that, thrown into a syllogism we have—

Snow is associated with whiteness.

The earliest February I can remember was associated with snow;

Therefore, February is associated with whiteness.

Possibly if the now long-forgotten link could be discovered, a good many other associations would prove to have been similarly formed. At the same time it seems hopeless thus to explain such curious arbitrary psychochromes as October and December black, Monday deep yellow, Thursday white, Tuesday pink, Wednesday brown, 9 P.M. yellow, 11 P.M. green, or the vowel *u* white, yellow, black, brown, blue, green in six different persons respectively. Equally difficult of explanation is what is known as the person's "own color." Certain people have their favorite color, that is the color they habitually associate with themselves and what more particularly concerns them. Thus Mrs. A. L. Felkin writes: "The color which I always associate with myself for no earthly reason that I can discover is blue. Therefore F, my initial letter, is blue; April, the month of my birthday is blue; and nine, the date of my birthday is blue."

It is not unlikely that some picture-book may have been the cause at work in giving chromatic character to certain words or sets of words. But most people shrink from confessing to what they regard as nothing more than a childish revival. Few at any rate are so satisfactory as to the problem of the origin of their psychochromes as Monsieur Peillaube's subject, for a large majority questioned on this point by Mr. Galton replied: "I cannot account for their origin in any way."

In concluding I shall try to get more light on this fascinating subject by considering the whole tendency to associate colors with concepts in the light of the two fundamental properties of protoplasm, affectability and functional inertia.

The former property may be briefly described as that in virtue of which the living matter, whether tissue, organ or organism, responds to a stimulus; it is the property which puts living matter into relation to or correspondence with its environment, the property, in short, of accessibility to stimulation; whereas the other, which seven years ago I named functional inertia,¹ may be described as that property in virtue of which the living matter does *not* respond to a

¹ The functional inertia of protoplasm, *Glas. Med. Jrl.*, 1901.

stimulus, whereby it is *not* in relation to or correspondence with its environment, the property, in short, of *inaccessibility* to stimulation. This property of functional inertia is the one that underlies inheritance and all conditions describable as the maintenance of the *status quo ante*.

Now there seems to me, in the light of the above distinctions, no doubt whatever to which property psychochromesthesia is related: it must be to that of functional inertia. The mental tendency, the result in consciousness of an antecedent cerebral tendency, is notoriously not one to be referred to the action of the environment, that is of any stimulation. The testimony of seers as to this is unanimous. External conditions they at once set aside as being causal factors in their psychochromes. In other words the tendency to form psychochromes is innate, inertial: it flows not from the reaction between environmental (educational) influences and protoplasmic affectability, but from certain little-known and non-acquired molecular dispositions in the protoplasm of the central nervous system in virtue of the functional inertia of which unalterable and arbitrary associations early unfold themselves to the consciousness of their percipient. We have abundant evidence as to the "very hereditary" character of both psychochromesthesia and synaesthesia.

Being inertial, this cerebral tendency is inherited not acquired, is due to "Nature not nurture" in Mr. Galton's phrase, and, not resulting from the raise level or the environment, these psychochromes are, as we have seen, remarkably stable throughout life. As they are not caused by so they are not continually modified by the environment.

Psychochromesthesia may in this way take its place in the same category as certain abnormal mental characteristics, propensities or powers. By "abnormal" I mean departing from the general average type of mind. Those who are psychochromesthetes depart mentally somewhat from the average normal which of course is, intellectually considered, not of a high degree of attainment. But this departure from the intellectual dead level of the majority, not being one due to training, indicates some preadjusted cerebral tendency which may express itself as "genius"

in one member of a family, as some form of mental instability or peculiarity in a second, as a high degree of artistic or musical ability in a third, as the gift of scientific or philosophical insight in a fourth, as "insanity" in a fifth, as psychochromesthesia in a sixth.

As we have seen according to Mr. Galton, seers are as a rule rather above than below the intellectual average. Those whom he mentions are George Bidder, Esqr., Q.C.; Dr. James Key, Cape Colony; The Rev. G. Henslow, Botanist; Baron von Osten-Sacken; Emeritus-Professor Schuster, F.R.S.; B. Woods Smith, Esqr.; and Colonel Yule, C.B. I could extend this list by adding the gifted novelist "Ellen Thornycroft Fowler," Professor Owen of Wisconsin, and Dr. Head, F.R.S., the able Neurologist and Editor of "Brain."

Genius is something notoriously not conferred by training or education, if not inherited it can never be acquired: the same may be said of psychochromesthesia. These things show us that it is not in the ordinary type of mind, but in the recesses of the slightly aberrant that the more recondite problems of mental physiology present themselves to receive if not immediate solution at any rate such study as can alone lead to a satisfying hypothesis.