

THE
PRINCETON
REVIEW

Edited by *Jonas M. Libbey*

SIXTIETH YEAR

JANUARY

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1884

A STUDY OF THE MIND'S CHAMBERS OF IMAGERY.

EVERY man, woman, and child has such a chamber where he or she has laid up a store of images or photographs of the objects which have been perceived. It may be interesting to take a look into it and inspect its contents, which will be found to be very curious. Every man has his own chamber of imagery with its separate furniture, grave or gay. It is the place of figures and fancies.

I.

I call the power which reproduces in old or in new forms our past experiences the Phantasy, a phrase employed by Aristotle to denote one of the faculties of the mind, and which was used in the English tongue down to the beginning of the last century, when it was abbreviated into Fancy, with a more confined meaning. The product may be called the Phantasm—always to be distinguished from the phantom, in which the object is imaginary. Phantasy is a good phrase to designate the remembrance or imaging of a single object, say a lily, as distinguished from a general idea, such as the class lily. The faculty may also be called the Imaging or Pictorial power, only there is no image or picture except when the reproduction is of an object perceived by the sense of sight—the other senses, however, being also capable of reviving what has passed before us. It is the mind's eye of Shakespeare: "In my mind's eye, Horatio."

All these phrases are figurative, always implying and pointing to a reality. We talk of an image, a likeness, a representation, an idea. In what sense? So far as the sense of sight is concerned, there is an image on the retina of the eye. But this is so situated that it is not seen naturally; in fact, it has been discovered by science. The object is perceived upright, but it is inverted in the eye. Then, so far as the other senses are con-

cerned, there is no image properly speaking. There is merely an affection of the organ—of the ear, the touch, the palate, the nostrils. Speaking rigidly, there is no image of a taste or a sound. Even so far as vision is concerned, the image on the retina cannot be said to be perceived by the mind. It is merely an affection of the organism of such a kind that it becomes the fitting means by which the exact form and color of the object is known; just—and not otherwise—as an ear makes known the sounds emitted. In respect of an image, there can be no such thing in the brain in regard to any of the senses. In all the senses there is an affection not only of the physical part of the senses proper, but of the brain; but this does not take the shape of a form of any kind. If there is no figure in the brain, still less can there be in the mind. A figure is an extended material thing. The figure of a tree is no more in the mind than the tree is. In all the senses the perception is simply a knowledge of an object under a certain aspect, say as having a form or odor. In this sense only is an idea the representation of an object. There is really no likeness between gold as out of the mind and the idea of gold in the mind. There is a correspondence between the two, but no identity.

In fact, this imaging power is merely one of the factors in the memory. In memory there is a recognition of an object or event as having been before us in time past. But in the mere imaging there is no such recognition and no reference to time. We may have a phantasm of a flower without any belief as to where or when we saw it, or indeed as to whether we ever saw it. But in all proper memory there is an image or phantasm, dull or vivid, representing the object or event recognized.

It has to be added, that the mind has the power of forming imaginary figures. These are compositions constructed by the mind out of realities experienced. We have now, not memory, but imagination. Our imaginations, as every one knows, are often more lively than our recollections. The mind delights to form such pictures, and it is the office of the poet and novelist to raise them up by the presentations they furnish.

First. We can thus reproduce the material got by any of the senses. We remember tastes of salt, of sugar, of jelly, of apples, of oranges, and hundreds of other things that are sour

or sweet, or do otherwise powerfully affect our palate pleasantly or unpleasantly. These recollections are not especially inspiring or poetical, but are cherished by gourmands, who feel as it were the taste in their mouth of the food they relish. We can recall the sensation produced by odors, say from roses, lilies, and violets, or from assafœtida, swamps, and malarial pools. Some of these are of an ethereal nature, and have a place allowed them in poetry. We can call up a thousand kinds of sounds, as the voices of our friends, the sighings of the breeze or stream, the barking of the dog, the mewing of the cat, the bellowing of the bull, the lowing of cattle, the chirp or the song of birds—say of the thrush or nightingale, the screech of the eagle, the rasping of the file, the mower whetting his scythe, the roar of the storm, the lashing of the wave on the shore, the rolling of the thunder, the crash of the avalanche. People endowed with a musical ear can recall tunes and are prompted to repeat them, and some are constantly hearing musical airs.

“ Music, when soft voices die,
Vibrate in the memory;
Odors, when sweet violets sicken,
Live within the sense they quicken.”

There are touches which we easily remember—of softness or smoothness, say of satin or of a smooth skin, or of the prickliness of a briar or thorn. The child retains forever the memory of a mother's kiss. But we get our most vivid and varied memories from the sense of sight. We delight to remember colors, say of a flower or a piece of dress, of the morning and evening sky. We image certain forms, as of the persons and faces of our friends, of noble trees, of well-proportioned buildings, of mountains. All that is picturesque, that is picture-like, that is with a well-defined shape, as steeples, cliffs, precipices, leave a photograph of themselves on our souls. The artist uses many of these in his paintings, in his portraits, and in his landscapes. The poet turns them to all sorts of uses in pleasing, in exciting and elevating the mind.

This imaging power helps greatly to enliven our existence. We call up an incident of our childhood. We remember the day on which we were first sent to school, and how we set out

from our parents' roof with strangely mingled feelings of confidence and timidity. As we bring back the scene, mark how everything appears with a pictorial power. We have a vivid picture, it may be, of the road we travelled; we see, as it were, the school-house within and without; we hear, as it were, the master addressing us, and the remarks which the children passed upon us. Or, more pleasant still, we remember a holiday trip in the company of pleasant companions or kind relatives to a place interesting in itself or by its associations; or the visit we paid to the house of a kind friend who had a thousand contrivances to please and entertain us. How vivid at this moment the picture before us of the incidents of the journey, of the little misfortunes that befell us, of the amusements provided for us, of the persons, the countenances, the smiles, the voice and words of those who joined us in our mirth or ministered to our gratification. We not only recollect the events: we, as it were, perceive them before us; the imaging is an essential element of our remembrance. Wordsworth is painting from the life when he speaks of

“ Those recollected hours that have the charm
Of visionary things; those lovely forms
And sweet sensations that throw back our life,
And almost make remotest infancy
A visible scene on which the sun is shining.”

Or possibly there may be scenes which have imprinted themselves more deeply upon our minds—which have, as it were, burned their image into our souls. Let us throw back our mind upon the time when death first intruded into our dwelling. We remember ourselves standing by the dying bed of a father, and then we recall how a few days after we saw the corpse put into the coffin and then borne away to the grave. How terribly distinct and startling do these scenes stand before us at this instant! We see that pallid countenance looking forth from the couch upon us; we hear that voice becoming feebler and still feebler; and then we feel as if we were looking at that fixed form which the countenance took when the spirit had fled; we follow the long funeral as it winds away to the place of the dead, and we hear the earth falling on the coffin as the dust is committed to its kindred dust.

Secondly. It should be specially noticed that not only are we able to represent these sensible scenes, we are further *able to picture the thoughts and feelings which passed through our minds as we mingled in them.* Not only do we remember the road along which we travelled and the building which we entered: we can bring up the feelings with which we set out from our parents' house, and those with which we passed into the school. Not only do we recollect the amusements which so interested us, but the feelings of interest with which we engaged in them. Not only do we picture the chamber in which a father breathed his last: we can call up the mingled emotions of anxiety or hope and fear with which we watched by his dying bed, and the grief which overwhelmed us as we realized the loss we had suffered. We bring up the feelings which chased each other as we sat by his corpse, or when we returned to our home and felt all to be so blank and melancholy.

We can thus live our mental experiences over again: the efforts we make to acquire a branch of knowledge, a new language, or a new science, and how we found the process to be irksome or stimulating; what we felt in our failures or our successes, in our fights and in our triumphs, in our friendships and in our enmities, in our temptations yielded to and our temptations resisted. As we survey the past, we can remember the gratitude we felt on kindness shown us, the sorrow that overwhelmed us on the death of a friend, the bitterness of the disappointment when our best hopes were frustrated, when one we trusted betrayed us, the pang that shot through us when we found that we had committed an unworthy deed. We are obliged to use metaphorical language in describing these recollections. We speak of our being able to image or picture to ourselves the outward incidents and the inward feelings, and we thus set forth an important truth.

True, we cannot give these mental states a sensible figure. The reason is obvious. They had no visible or tangible form when we first experienced them, and the memory, in reproducing them, will represent them as they first presented themselves. This circumstance, I may add in passing, furnishes an argument of some little force in favor of the immateriality of the soul. In our primary knowledge and in our subsequent recollection of

bodies we have a sensible image. But in our consciousness of our mental states and in our recalling them we do not, and indeed cannot, so represent them. We give a bodily shape to the school at which we learned our tasks, to the persons and countenances of our early associates, but we cannot give a form or local habitation to our remembered cogitations and sentiments, which live in a higher sphere.

It is conceivable that the memory might have been as correct as it is as to matters of fact without having any pictorial power. In fact, the majority of our memories must be of this character. It is well it should be so, for otherwise excitement would waste our life, and keep us from the performance of many commonplace but important duties. But that is a most benignant endowment whereby we can image absent objects and past events, lay them up in "chambers of imagery," and make them pass as in a panorama before us. We can thus have a series of paintings of all the scenes in which we have mingled, a set of portraits of the friends with whom we had sweet intercourse, and we can view them as Cowper did his mother's portrait :

"Faithful remembrancer of one so dear;
And while that face renews my filial grief
Fancy shall weave a charm for my relief,
Shall steep me in Elysian reverie.
A momentary dream that thou art she,
By contemplation's help not sought in vain,
I seem to have lived my childhood o'er again—
To have renewed the joys that once were mine,
Without the sin of violating thine.
And while the wings of fancy still are free,
And I can view this mimic show of thee,
Time has but half succeeded in his theft—
Thyself removed, thy power to soothe me left."

This imaging power, as it tends to enliven the mind, so it also tends to give vividness to its productions in words and writings. He is an interesting companion who, having laid up a store of pictures, is ever bringing them out in his conversation. Travelers and biographers instruct us best when they are able to give us a word-painting of the scene and of the man or woman. History is vastly more attractive when it gives the event with its concomitants—say the battle with the field on which it was

fought. Our pictorial writers are generally the most popular. In the mediæval ages they illuminated the manuscripts to attract and delight the eye. In our day, books in almost every department of literature are illustrated. This power has a still more important function. Nothing tends more to degrade the mind and sink it in the mire than low and sensual images rolled as a sweet morsel under the tongue. On the other hand, images of duty, of self-sacrifice, of courage, of honor, of beauty, of love, elevate and ennoble the soul.

Some of the phantasms are much more vivid than others. They differ also in the case of different individuals, and of the same individual at different times or in different states of his body. It is a curious question what can be the cause of this difference. Without professing to exhaust the subject we may specify some circumstances which undoubtedly have an influence on the vividness of the picture.

1. There is the original vividness of the sensation depending primarily on the sensitiveness of the organ, but under this also upon the nature of the object perceived. The senses evidently differ in this respect. The most lively is the sense of sight. The forms and colors originally made known by it may come up almost with the distinctness of the realities. The mental representation (we can scarcely call it picture) of sounds is often very intense, especially in the case of those who have a musical ear, but also when the impression on the ear is strong or vehement—made, for instance, by the bursting of a cannon. Tastes and odors may also be recalled with less impressiveness, as also touches and feelings in our nerves. There are times when our sensations of shapes, colors, and sounds are very intense, and in these cases they are apt to be reproduced with greater vividness. There are scenes of gorgeous coloring, there are picturesque figures, such as horrid precipices; there are sounds such as those of a falling rock, of thunder, or of an avalanche, which we can never forget. Some persons are evidently more susceptible of intense impressions than others, and in these cases the images are apt to be more vivid, and these may be embodied in paintings, in statues, or in word-painting in prose or poetry.

2. The formation of the image is dependent on the state of

the brain. It is believed that even in our sense-perceptions there is brain action. It seems to be established that the third convolution of the left side of the cerebrum is the organ of the symbolic power, or of language. Some eminent men, such as Hitzig, and Fritsch, and Ferrier, maintain that each sense has a separate location in the brain; others deny this. Without entering into this discussion, it is allowed that brain action is necessary to sense action. The whole eye might be perfect and yet there is no vision if there be a lesion in certain parts of the brain. Not only so, but brain action is required in order to the reproduction of our sense-perceptions. Now it is highly probable that the same part of the brain acting in the perception is necessary in order to its reproduction. When there is a lesion of a certain part of the brain it may not be possible to form an image of the object. In all cases the vividness of the image may depend on the health and susceptibility of the brain matter.

It is well known that persons may lose certain of their recollections while they retain others. The defect seems to arise from a lesion of the brain. We have the record of persons losing the power of picturing forms, while their memory was good in all other respects. We have more frequent instances of people losing their power of using languages or particular languages. This is the disease of aphasia, arising from a derangement in the organ of language. There are cases of persons losing a portion of their knowledge for a time and then recovering it; perhaps losing it suddenly, and recovering it as suddenly. In all such cases it looks as if, in acquiring the original knowledge, there is a certain state of the brain produced, say by a certain disposition of the molecules, probably in the gray matter in the periphery of the brain. Where there is an effacement or derangement of this matter in the brain the knowledge cannot be recalled. Sometimes the disorganization is only for a time, and when it is cured the mental power is ready to act.

3. There is the mental force particularly of the attention directed to the scenes as they first passed before us. We were interested in them, we turned them round and round, we viewed them under various aspects, and having been so encouraged and fondled, they are apt to visit us again and again, and put on their

best expression. The painter has to study the features of landscapes and the countenances and attitudes of men and women to give us correct figures on his canvas. Under this view, the capacity of bringing up images is more within our power than we might at first imagine.

JAMES MCCOSH.

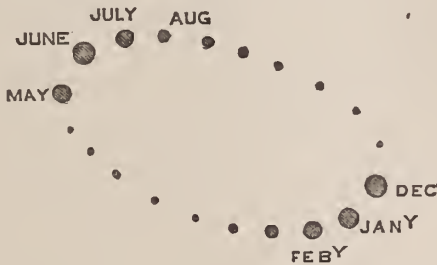
II.

Dr. McCosh, in the first part of this article, has described the general laws and characteristics of our mental imagery. There follows in the second part an account of some of the results obtained from a special inquiry into this subject, by means of printed questions circulated among a large number of college students.

This inquiry began in 1881 with the distribution at Princeton and Vassar Colleges of Mr. Francis Galton's *Questions upon the Visualising and Allied Faculties*. The replies—about sixty in number—were forwarded to Mr. Galton, who made some use of them in his recently published "Inquiries into the Human Faculty." This work embraces the very original psychological studies of a number of years, and will have a wide influence in popularizing this branch of research; among a great variety of subjects it brings out with force the well-known theories of the author in regard to the obscure influences of heredity and environment, or nature and nurture, upon our ordinary mental operations. Dr. McCosh and myself took up the subject in its more purely psychological bearings, and in pursuing the investigation we have adopted Mr. Galton's method. His Questions, full as they were, naturally did not exhaust such an extensive subject, and a careful reading of the first set of replies suggested several lines of inquiry which might be more fully followed out. The plan took shape in our issuing a second series of questions, which covered some of the problems already discussed by Mr. Galton, and in addition entered some branches of the subject which before had remained untouched. Copies were distributed at Princeton, and a number also were sent to the Harvard Medical School, through the kindness of Professor Stanley Hall.

As it relies wholly upon self-analysis, this method of research is open to the twofold objection that many persons have distorted

ideas of the working of their own minds, and replies may be governed by preconceived notions derived from various sources. It must be confessed we looked somewhat suspiciously upon the first batch of answers, for there seemed to be too much of the personal equation about them, tho signs of the real trustworthiness of the method soon came to the surface; sets of replies from widely scattered sources corroborated each other and fell into natural groups. One such instance may be cited: it was found in a *number-form*¹ which a Vassar student handed in. Never having seen those of other persons, her representation was independent of any previous knowledge of the subject, yet it bore a strong likeness to several which Mr. Galton had obtained in England. Again, a young physician who had never given the subject any attention before, described to us one evening an oval image, in which the twelve months of the year invariably arranged themselves before his mind's eye; the accompanying drawing gives a rough idea of it.



This image coincides with Mr. Galton's description of several which he collected in England. These are two illustrations among hundreds which might be quoted if this method were in need of vindication. Individual eccentricities are often discredited until the circle of inquiry is widened and one apparently anomalous case is matched and authenticated by a similar one from another source. Individual errors of self-inspection are lost in the general results. It must be kept in mind, however, that those who do not possess a vivid imagery are far less

¹ The term *number-form* has been applied by Mr. Galton to vague images which arise in some minds in connection with the arrangement of numerals.

likely to reply than those who do, so that if the replies are collected at random the averages are apt to be too high.

We give below an abstract from the series of thirteen questions which we distributed; among these, numbers 5, 6, and 12 were taken with some slight change from Mr. Galton's series; the remainder were original. Beneath the questions is printed a portion of one of the sets of replies which we received.

The object of these Questions is to ascertain the degree in which the power of forming images in the mind's eye exists in different individuals, and at various ages in the same individual; also how it is influenced by intellectual pursuits and tastes and by the states of mind and body both at the time the images are formed and when they are reproduced.

QUESTIONS.

4. Estimate the relative vividness of your remembrances of (a) Form, (b) Color, (c) Odors, (d) Touches, (e) Sounds.

5. *Persons*.—Can you recall with equal ease the faces of near relatives, friends, or people you have seen but once? Can you cause the image of a well-known person to sit, stand, or go through unusual motions such as in Calisthenics? Where a face is with difficulty recalled what mental method do you adopt to facilitate the process?

6. *Comparison with reality*.—Have you ever mistaken a mental image for reality when in health and wide awake? How frequently do mental images arise in your mind without an effort of the will?

9. *Emotions*.—Can you recall emotions or states of mind and feeling as clearly as images of external objects? Which do you recall most vividly—(a) natural scenes, (b) persons, (c) states of mind during prominent events in your history?

10. *Physical state*.—(a) Are the most vivid mental images that you can now bring up associated with any definite physical state at the time you formed them, such as active exercise on horseback or in running, or such as comparative repose in reading or study? (b) Do you seem to be able to call up mental images easier at one time of the day than another, or in an active rather than a quiet state of body? (c) If you have ever experienced any impairment of vision how has this affected your visualising power at the time or subsequently?

11. *State of mind*.—What was the state of mind in which the most vivid mental images you can now recall, were formed? In what states of mind can you recall mental images most readily?

12. *Childhood and age*.—Have your powers of visualising varied much in your recollection? At what age were the earliest mental images formed which you can still recall. State if you can what is the character of those images—do they seem as bright as those formed in later years? What

events of your home life in childhood do you recall most readily or vividly?

13. Have you come suddenly upon an entirely new scene, and while certain of its novelty felt inwardly that you had seen it before—with a conviction that you were revisiting a dimly familiar locality? Mention if you can an instance or two in which this has occurred. Has any satisfactory explanation of this experience ever suggested itself to you?

REPLIES.

4. Form is vivid. I can see the shape of almost every article of furniture. Color is not very distinct. Odors are only distinct when physical state calls them up, as odor of food when hungry. Touches are merely clear, while sounds are often very vivid. Certain sounds make me shiver to think of them, so vivid are they.

5. I have no image of my nearest friends, but can call up the face of some person I have met lately. But I cannot do this more than two or three times when the face is lost to my vision. I can place figures of persons in certain positions; for instance, I can see my father, excepting his face, in his pulpit. The way I call up what faces I can is by thinking and imaging their surroundings or dress.

6. I never mistook a mental vision for reality. Mental images, since I have been in college, have been almost wholly by will, but formerly they came more readily.

9. I do, and even more vividly. I feel over my sorrows, etc., often most keenly. I recall natural scenery more vividly than faces, but mental states most vividly—often in feeling over mental states, involuntarily acting, tho I cannot say that I ever mistake them for reality.

10. Mental images, so far as I have been able to observe, come most in a passive state of body, and are not associated with any particular exercise.

11. When I am engaged in any kind of mental labor my visions do not come. When I am in a comparatively pensive state with no particular mental object in view, I am most apt to have images.

12. My visualising power I feel is not so good as it was a few years ago. I do not remember when I did not have mental images. I recall very vividly my sister falling into the water and how she looked when she was rescued, tho I was not over four or five years old at the time.

13. I always form a mental image of a place to which I am going for the first time. Sometimes the actual scene conforms with my image, but by a little effort of memory I am usually able to trace the connection.

These answers are somewhat above the average, but upon the whole the replies were intelligently written, and afforded a large quantity of fresh material.

Figuratively speaking, the machinery of our visual memory works unevenly, well oiled here and rusty there; talent for imag-

ing one class of objects may be offset by a marked unskilfulness in imaging another. As Mr. Galton has observed, no one could have foreseen the extent of individual variation which this investigation has disclosed. We wish here to lay the emphasis not upon our imagery of classes of objects, for that largely hinges upon individual taste and education, but upon the caprice of our imagery among objects of the same class. Take faces, concerning which our information is amplest: prominent as they are in our chambers of imagery, no one seems to have an even gift of recalling them, as shown in a number of answers to *Question 5*, selected at random.

(1) I can recall the features of some exceedingly well-known persons, as of my own family; (2) It is hard for me to image faces with great distinctness of detail; (3) I can recall comparative strangers with more ease than near relatives; (4) I can recall the features of many persons, of almost any one, better than of my friends and relatives; (5) I can recall the features of all whom I have ever known intimately, except my mother; (6) I frequently recall faces with vividness, *but not at will*; (7) I can recall the features of males better than of females; (8) I can only recall the features of those who have been lately seen; (9) There are a few persons very well known to me whose features I absolutely cannot recall, and it is very annoying; (10) I can recall readily persons, friends and relations; (11) I can recall all quite distinctly, but those with whom I am associating every day, with more distinctness than others, as my classmates at college better than my friends at home.

Various as these cases are, a more deliberate view of them suggests a number of underlying principles which give a distinctive character to the imagery of each person and are not beyond our finding out; beneath these principles are still deeper causes quite beyond present search. Let us look at some of these cases more carefully. Number 8 is a person whose imaging power in general is quite high; he resembles number 11 in his images of persons; they are bright soon after they are formed, but when some weeks have elapsed they lose distinctness. Another writer says: "To every rule I can lay down I can find exceptions, but I think this is absolutely true: for a few days after seeing a face I can recall it more or less clearly; gradually I lose the power, and after a week at the longest I am unable to bring it back." Numbers 3, 4, and 10 may also be grouped; the more frequently

they see a face, the more difficult it is for them to visualise it. Numbers 1 and 10 give testimony which is directly opposed to this. Number 5 is a somewhat exceptional case, but it is confirmed by others, one of whom writes: "I can see all relatives with whom I have been very intimate, distinctly. Yet there are two or three persons with whom I am nearly as intimate as with my parents, and I cannot visualise them at all distinctly." Others who form clear images of natural scenery say they cannot see faces at all. Number 6 speaks of his difficulty in recalling faces at the moment when he wishes to do so; others say the same. Their images defy the most determined effort to bring them forth at one moment and flash out spontaneously the next.

In one's images of persons it is obvious that the obstacles lie both in the original impression and in the recalling power. Of some faces which perhaps lack individuality we can make no clear mental record at all; or perhaps the record is clear for some days or weeks and then is either obliterated or it refuses our summons; or, again, we form a clear mental record of a face the first time we see it, and after seeing it a number of times the individual records confuse each other. Then our recalling power may be wholly at fault, images may elude us altho we are confident we possess them. It follows that in many cases we cannot decide where the responsibility lies, whether the recording or recalling power is out of gear; if an image occasionally refuses the summons of the will what a short step it is to its never appearing before the mind's eye voluntarily, and just as we are inferring that we do not possess it, some extraordinary stimulus brings it forth. Phantasies which arise in the mind uncalled for are not only of little service to us, but are inconsistent with close thinking; we therefore, as students, avoid them; when we cease to exercise our will-power upon our visualising faculty, we take the first step towards losing what may become an invaluable ally of study. Images under control are as useful as mere day-dreams are worthless. Replies to *Question 6* from a number of advanced students illustrate how variable is the tenure of the will over our imagery:

"Since I came to college my images have been almost wholly voluntary, formerly they came at random;" "Distinct images rarely, confused images

frequently, come involuntarily: the latter may be made more clear by especial attention;" "Very often I cannot drive such images from me;" "My brightest images come when I do not call them; some faces which I can never recall come unasked."

As to the trouble which many experience in recalling faces as compared with more stable objects, M. Taine, among other writers, offers the correct explanation: "And so when I think of a person, I know my memory wavers between twenty different expressions, smiling, serious, unhappy, the face bent on one side or the other." Several students write that when they are unable to recall a face they try to visualise a photograph of it; here the image is strengthened by repetition since the original never varies. Nevertheless it is probably true of imagery as of memory for abstract facts, that the repeated impressions even of a fixed object may sometimes tend to obliterate each other. Various other devices are resorted to to assist a feeble imaging power. Some construct a face by a halting process, adding feature to feature until the whole is complete. Analogous to this is the statement of one student that when in poor health he can only see a portion of a face, say three or four of the features at a time. Galton has treated of these peculiarities quite fully.

A question enters here which is of the greatest interest. Does the mind ever automatically blend the different memories of a face or of a number of different faces into one generalized image, or can such a blending be effected by any voluntary or conscious process? Have we, for example, an image for the class Chinaman which is not taken from any particular individual that we have seen, but is a resultant of the faces of a number of Chinamen? In other words, have mental pictures been formed by any process which corresponds even in a remote degree to a composite photograph taken from a number of faint impressions superposed? It is true we unconsciously combine separate features of different faces or landscapes, or, as frequently happens where memory is indistinct, we may mistake a general resemblance for identity; but such pictures, which are among the ordinary products of imagination, are radically distinct from a composite, which as a whole resembles all, but in its parts is unlike each. Mr. Galton, if we understand him aright, answers this question in the affirmative, but it seems to us still open to very

considerable doubt. Is it not probable, among other explanations that might be offered, that such memories may be of particular scenes or faces which we mistake for generalized images because we cannot locate them, the reference points of associated time or space having been forgotten?

There can be no doubt that the mind's eye ordinarily reverts consciously or unconsciously to the appearance or expression of a particular moment.

"Accuracy and distinctness decrease," says one writer, "as I depart from particular instances." Another says, "I try to remember some vivid experience in which that person figured conspicuously; I can then recall the exact expression of the face as it appeared when it engrossed my attention."

Others rely upon association with a particular locality, dress, or attitude of the body. This for example is apt to be the case with mothers when they try to recall their children at different periods of life.

"There is an absence of flexibility," writes Mr. Galton, "in the mental imagery of most persons. They find that the first image they have acquired is apt to hold its place tenaciously in spite of subsequent need of correction." In imaging a friend's face the favorite or most frequent expression naturally rises. We have met two cases which illustrate the occasional obstinacy of our visual memory. One often hears the expression "rooting out old ideas;" the same phrase may be aptly applied to images. In the first case the substitution of a later for an earlier image progressed without the subject's being at all aware of it.

"I recall a lady aged about twenty-five," says the writer, "who lost her father when she was twenty. An artist was subsequently engaged to paint a portrait of her father from an old photograph. He made many changes at the suggestion of friends and relations so as to make it conform as nearly as possible to the appearance before death. Said this lady, 'It is a poor likeness, and does not look like my father at all.' She was accustomed to call up his image as he sat in his usual seat, but he always bore the image he bore before death. In about two years she discovered that she could only recall her father with the likeness which he bore in the painting. From association she had become familiar with the picture and gradually lost the true image of her father. It was just as easy to recall him, but when she did so he looked exactly as he did in the picture, and she could not summon his face at all as it appeared in life."

The second case is a remarkable one, and is well authenticated; we give the writer's account of it:

"A year or two ago I was suffering from near-sightedness and seeing everything double. I had an operation performed by Dr. A., which, with the use of glasses, restored my eyesight and corrected the imperfect co-ordination. If I attempt to recall scenes that I saw while my eyes were out of order I invariably see them as they appeared during that time, altho I may have seen them many times since the operation. For instance, in the case of the minister in the pulpit at home I see two images of him, no matter how much I may try to get rid of one of them. My recollections of the Examination hall and of the Examiner, upon entrance to college, are affected in the same way, altho I have since attended several courses of lectures in that room. When I think of the Examiner, his several positions are all very clear, but all double. My recollection of the office in which the operation was performed is also of everything as double, altho I saw it only twice before the restoration of my sight and many times after. The objects which I have seen since the operation are always single when recalled."

The images formed in childhood are with most persons clearer, brighter, and more numerous than those of later years. Among twenty-eight students three believe that their powers of imagery have improved, thirteen say that they have not varied, twelve say that they have diminished. This is due in many cases to disuse, for there can be no doubt that the elaborate imagery of some older minds is far more wonderful than anything found among children. Children's images, apart from the natural strength of their Phantasy, are vivid because they see form, color, and outline dissociated from any distracting ideas which would enter the mind of an adult. A child looks at a pony engrossed with its external characters, rough coat, long mane, and so on without thought of price, age, or disposition. This concentration and simplicity of the mental concept affects the memory as sharp focussing affects a sensitive plate. The earliest images recalled from childhood are amusingly trifling; they are often of objects which touched the childish vanity, such as the first long trowsers or new blue dress, the first day at school, the first steamboat. But it is unquestionable that besides these little events which can be recalled there are images stamped upon our childish minds which are only roused years afterwards by some strong *instigation*.

Our very earliest recollections are in the form of images, not of abstractions. Judging from the average obtained from many writers, most persons can recall one or two scenes of their fourth year, a few can recall objects which were seen between the second and third year. One lady writes :

"When I was eighteen years old I suddenly recalled a vivid picture seen from a steamer deck while held by my nurse, the oblique lattice below the steamer rail and the silver reflection of the moon on the water forming a path over the lake. I learned from my mother subsequently that I was nineteen months old at the time, and was on a journey over Lake Chautauqua."

We have other cases which are similar. Carpenter gives an instance of visual memory extending back to the age of eighteen months. Still earlier impressions may have been recorded by others. The suspicion in regard to such early images is that where the associations are forgotten we cannot be assured of their genuineness. They may either be of objective or subjective origin, the former produced on the retina by external objects, the latter mere coinage of the imagination. We can clearly visualise our dreams, and conscientious as our self-scrutiny is, such visualisations may be mistaken for images of real objects. Here is the key to the ludicrous mistake which young people sometimes fall into of insisting upon their recollection of scenes which happened before their birth, as in the case of a little boy who declared he had been present at his mother's wedding, "because he saw it all so plainly."

One point worth reverting to here is the evidence we have of images recorded in the mind, which, if ever recalled, arise so vaguely that our consciousness only gets the dimmest glance at them; they suffice merely to give us a vague sense of recognition. Hawthorne, in "Our Old Home," describes his first visit to Stanton Harcourt, near Oxford. All the interior details of the famous old kitchen seemed unaccountably familiar to him; there was no freshness or sense of novelty about it, and he was quite at a loss to account for his apparent familiarity with the place. Several weeks afterwards he suddenly recollected that when only eleven years old he had read Pope's description of the kitchen. The vivid subjective image formed at the time had never been effaced.

The mistaking of images for reality is as common among children as it is rare among adults. In advancing age we become skeptical, not only of facts, but appearances: every mental state runs under a fire of scrutiny; we have acquired a hearty contempt for visual deceptions of every sort as implying a lack of mental control and contrary to the whole tendency of good education. An image attains the force of reality only when the faculty has the ascendancy over every other; when the attention is riveted upon the object, the gates to the outer world are fast closed, and we are in a world of phantasy. Illustrating how liable we are to sense-deception while in this strongly subjective state is the following:

“Once after reading of *Lady Dedlock* in a chapter describing a stormy evening in ‘*Bleak House*,’ I took an umbrella to go out, and was surprised to find it a clear night; I was positive I had heard the rain on the windows.” Again, “Once, while seated in my room reading, I thought I heard some one sweeping in the next room, the door between being open. Finally the dust became so disagreeable as to cause me to cough; I arose to close the door, and was surprised to find the supposed noise of sweeping was made by a dog’s tail wagging on a straw matting not far from me.”

A thoughtful reply to *Question 6* may be quoted here: “I realize that a mental image is formed within the mind and thence projected outwards—a reversed process which I could never mistake for reality. The image is of a different nature and effect from that of a real object.” With children there is no such sifting process. We find numerous examples of their deception; similar stories to the one below are often met with in family lore:

“I have been told,” says the writer, “that when I was a small child I possessed an imaginary friend, to whom I was often overheard talking an hour at a time, and apparently satisfied with the reality of the conversation. Having ceased to speak of or to this imaginary friend for some time, I was asked what had become of him. I answered that he had been killed in the war (then raging), and was never heard referring to him again. I have only been told this by my family, and cannot tell how far I was myself deceived.”

We have been dealing thus far with visualisations of color and form; the replies to *Question 4* have given us an opportunity of comparing these with the recalled sensations of touch,

taste, sound, and smell. Only a few persons can recall odors; one writer asserts, on the other hand, that odors are the most vivid of all his recalled sensations. Touches are the next rarest, then sound, then color, while form is most frequently recalled. Of twenty-five writers, all say they can recall form in some degree, and two thirds of these recall form more distinctly than anything else which comes to the senses. Colors, according to this series of replies, can be fairly recalled by about two persons out of three, but not so vividly as form. With only one fourth the number was the recalling of form and color equal; with one tenth was the recalling of form, color, and sounds equal. Those who recalled sounds could in few instances recall colors readily, and in many cases there was a vivid recollection of color with a dim idea of form, or *vice versa*. Nineteen could recall form best, eleven could recall colors best or as well as form, nine for sounds, three for touches, and two for odors. These proportions probably indicate but roughly those which would be obtained from a larger number of persons. Among individuals they partly attest the relative inborn acuteness of the various senses, as well as individual preferences for certain qualities of objects; objects of distaste are naturally suppressed from our imagery as far as we can control it; throughout all is the principle so well brought out by Mr. Galton that our powers of reviving the impressions of different senses are very uneven.

There seems to be no invariable correlation between power of imaging objects and that of reviving states of mind or feeling, (*Question 11*); while many persons possess both, others vividly recall emotions with no power of imagery, or the reverse. In the original impress upon the mind they are somewhat akin. A careworn face rouses a sudden sympathy; associated together, the face and the emotion make a lasting stamp on the memory. Why are they dissociated in their revival, the sympathy actually, perhaps painfully, felt again; the face perchance a mere recollection, as of a dry fact with no mental picture? This is an unexplainable inequality in the action of the reproductive powers, which is without question characteristic of many minds.

Here are two instances selected from a number :

"I can only recall states of mind with a great effort, and then imperfectly, the results being of a volatile character. In recalling natural scenery the image is fairly clear, the objects are defined pretty much as they are in nature, and the colors are quite distinct."

"I recall emotions or states of mind much more vividly than images of external objects. The image of my room at college is very dim, few of the objects are well defined at once, and I have little power over color in my images."

It is a familiar fact that images have certain physiological and emotional states, as the condition of their making a strong impression upon the memory; but it is a curious and rather unlooked-for truth, that similar states of body and mind effect very diverse results in different people. With the majority, the various stronger emotions are associated with the formation of lasting images; with one person, joy gives rise to the most vivid pictures; with another, sorrow; but the brightest pictures are formed in some minds when undisturbed by physical or emotional excitement.

"When the mind has been in a perfect state of relaxation," says one writer, "I have formed nearly all the images which I can now recall." Another writes: "The state of mind in which the most vivid images were formed was one of rest, when I could take in slowly or comprehensively the occurring events."

So with our physical states, their influences are quite as diverse. Our facility in recalling natural scenery is undoubtedly due in some measure to the healthy lung action of out-door exercise and pure air, and resulting purity of blood circulating in the brain. A member of a Hare and Hounds Club speaks of the accuracy with which he recalls the minutest details of a stretch of country covered by a long run; while after repeated trials the interior of his college room rose in a very confused manner before his mind's eye. With many persons, on the other hand, bodily exercise is not conducive to the clear exercise of this faculty. "I can bring objects most clearly before my mind," writes one student, "when nervous stimuli are aroused and muscular are not."

In this paper a mere outline has been given of the information which we have received. Abundant as our material is, it

would still appear that we are merely upon the threshold of the knowledge which this method of psychological research opens out. The meagreness of what has been already learned is apparent when one thinks of the countless similar channels of inquiry as yet untried.

HENRY F. OSBORN.

III.

So far Professor Osborn. I have a few remarks to make in closing.

There are mistakes in some of the replies, arising from a failure to apprehend the relation between the visualising or imaging power and memory. The phantasy is an element in memory. There may be images without any recognition of time in our past experience; but in all memory there is a representation of the object. When the query is put, "What sort of image have we of an emotion, say of fear?" the person answering thinks we are asking about a figure, and says he has nothing of the kind, whereas he has a very vivid remembrance of his fear as a mental affection.

There is often a vagueness in the answers because there is no test to apply. If we put the question, "Was the day cold?" to a number of persons, we may get discordant answers when they trust to their sensations, and do not try them by a thermometer. In like manner, when the question is put, Was your idea of such a thing vivid? we are apt to get varied answers.

This article is meant to be a contribution to a psychological subject which invites to further investigation. It proceeds on the method which Bacon held in view: "Does any one doubt (rather than object) whether we speak merely of natural philosophy, or of the other sciences also, such as logics, ethics, politics, as about to be perfected by our method?" "We certainly," he replies, "understand all these things which have been referred to; and like as the vulgar logic which regulates things by the syllogism pertains not to the natural but all science, so ours which proceeds by induction embraces them all. For thus we would form a history and tables concerning anger, fear, modesty and the like, as also examples of civil affairs, not omitting the mental emotions of memory, composition, divi-

sion, judgment, and the rest, just as we form such of heat and cold, of light, vegetation, and such like." Investigations on this plan are diligently pursued in the present day: as an example we have Prof. Stanley Hall's article in this REVIEW (May, 1883). I rejoice in these researches as throwing light on secondary and subsidiary topics of deep interest. But I deny that this is the only or the main method in which the mind is to be studied. After all, we come to know what perceptions are, what judgments, reasonings, remorse, hopes, fears, resolves are, by self-consciousness or the internal sense. The statistical or tabular method is to be called in as auxiliary to the other.

JAMES MCCOSH.