CHAPTER IV
SYSTEMS AS NLED-SATISFYING

Round out nearly—our weal or woe,
Trains of thought invariant grow.

68.—What is implied in a Secondary Unit or Idea? *

I say to myself "Have I seen that face before?" Forthwith there shoots up a picture, † and I answer my query with an emphatic "Yes."
[Do images occupy sensible time in developing? Experiment.] What precisely, it may be asked, is the crucial factor which makes me answer in the affirmative? The question, as we notice, was followed by a particular image the features of which I could trace almost to the daintiest detail, having observed and scanned them a few minutes previously. Apart from what has been described, relevant matter was absent. No sound, no touch, no action, no connected systems, no pleasure-pain, no estimate of the man's intellect, beauty or goodness, was re-produced with the visual image. Nor was any feeling present which might be called the feeling of

* I have called a percept or an idea a compound, because in a compound a system of sensations or images is involved. Such compounds, again, are the normal units of thought rather than the integers of which the compounds are composed. If, however, we consider a unit of thought to be a compound, then we reach the somewhat unsatisfactory conclusion that compounds are often integers, since the unit of thought is sometimes an integer. We must, therefore, either redefine our terms or employ fresh ones. For practical purposes, we shall hence ignore the occasional contradiction involved; but for theoretical reasons we may speak of a unit of thought or action as a primary or secondary unit, or a combination unit.
† The phrase "Forthwith there shoots up a picture," raises the problem of how far sensible time is occupied in the development of any image. I have experimented to a considerable extent, and the conclusion suggested is that, in my case at least, no development is noticeable. A face may immediately present itself, or when time does elapse, that time is contentless as far as the face to be re-collected is concerned. If a landscape is to be re-developed, or the features of an absent face are to be separately observed, the time elapsing is accounted for, as in ordinary sight, by the continuous sweep of the attention in its endeavor to re-etch the face or the scene. If written words are re-developed, there is equally time spent in reading the words. If words are written in the imagination, the characters develop, as far as sight is concerned, precisely as in writing with a pen. Even when in thought a name can only with great difficulty be pieced together, there is still no sign of growth in the image. Under these circumstances we have to allow that to all intents and purposes images, like sensations, shoot up and do not develop, as far as observation is concerned.
relevant re-collection. The image pure and simple stood by itself. [Test in your own life.]

The re-developed face constitutes at the time being the whole idea of the man, for nothing beyond that face is implied immediately. Furthermore, when an image is produced as we put a question such as we started with, affirmation ordinarily follows. It can be shown that no vital bond exists between the image which results and the true answer. For instance, it happens not infrequently that instead of re-membering X, we mistakenly and unsuspectingly re-member Y; thus we may be convinced that we have met a person, when we have only seen his portrait or have not seen him at all. [Observe such occasions.] In this manner, especially where there is profound organic disturbance, as in insanity, replies to questions are often beside the point. Again, when we know that we are liable to mistakes along certain memory lines, as happens occasionally, we proceed, as a precautionary measure, to re-collect additional details, e.g., the man's voice or the place where we last met him. [Test experimentally.] If, after taking such a precaution, we find that the items form a system, we consider our conjecture confirmed; but if no other connected aspect be re-producible, we remain in doubt. Hence we conclude generally that the image did constitute a secondary unit, and that its prompt appearance argued its relevance. The notion of the man, however, was not involved in logical completeness in the image, since the full notion consists of the total that can be re-produced in connection with him, consists, that is to say, of the universe of memories. In so far as we thus re-member relevant details, so far do we exhaust and exhibit the notion of the man. On any particular occasion, on account of the nature of the brain, there is re-membered, as we shall see, that which is relevant, and it is that which constitutes the relevant unit or idea. From a psychological point of view, therefore, we must insist that a secondary unit is no more complex than it appears to the careful psychologist, i.e., that the secondary unit or idea means no more than it says. It is not necessary that everything remotely or closely pertinent should be developed in its true or in a changed form. The reason for this we shall learn in the sequel.

69.—Richness and Poverty of Detail in a Secondary Unit or Idea.

We assumed the re-instatement of a face which was to all intents and

* * *

Many authors have been struck by the apparent emptiness of ideas, and have tried to explain the anomaly. Dr. Stout has attempted to overcome the difficulty by maintaining as a general theory that there exists the idea as well as its meaning or significance. Thus he says: 'A hearer who knows the multiplication table knows what follows as a whole without detailed repetition. The beginning of the series is equal to the whole, and it is just because it means the whole that it is unnecessary to repeat the whole in detail' (Manual, 1898, p. 85). Now when anyone hears for the first time the phrase cogito ergo sum he is not satisfied with the assurance that the words have a meaning, for he wants to know what that meaning is. Dr. Stout, if I understand him aright, never goes beyond the first step of assurance, raising his suggestion apparently into a metaphysical construction (ibid, p. 616). We shall now see that the meaning lies not behind an image or a word; but in the possibilities of revival, and in the simplified trends connected with such revival.
purposes indistinguishable from reality. Such completeness, as observation teaches, is the exception rather than the rule. Thus, to take an extreme instance illustrating poverty of detail. About seven years ago I saw a certain acquaintance for the first time. Since that period I have met him on countless occasions, and when I think of him it is usually that first image which re-appears. The detail was at first, without much doubt, present in profusion; to-day the most careful scrutiny reveals but a patch of shady black which defies analysis. [Recall a quantity of old and recent events and note the detail.] It is as if wind, frost and rain had for years wrought their spite on a picture, and had effaced colour, form and meaning. This patch of shady black, without regarding its slow devolution, is as truly a unit as was the thoroughly re-produced image of the acquaintance two minutes after he was met for the first time. Though the two images differed considerably in the amount of detail which they possessed, yet one as much as the other was merely a relevant unit or idea. Given the two extremes, and it will be readily understood that all possible intermediate degrees of resemblance to reality must be judged by the same standard.

James Mill admirably and fearlessly expresses the common opinion that words or ideas have adequate contents. He writes: "If I say, I have the idea of a horse, I can explain distinctly what I mean. I have the ideas of the sensations of sight, of touch, of hearing, of smelling, with which the body and actions of a horse have impressed me; these ideas, all combined, and so closely, that their existence appears simultaneous, and one. This is my idea of a horse" (Analytic, 1869, i, p. 234).

70.—Each of the Five Senses Supplies Us with the Material for Secondary Units or Ideas.

A unit may consist, as we have learnt, of a single visual image of indefinitely varying content; but yet units of a different order are nearly as common. Just as the affirmative reply followed the presence of the imaged face, so a similar answer would have been forthcoming, if a laugh, a lingual utterance or the creak of boots had been re-instated, vividly or otherwise. An auditory image has precisely a like value with a visual one, for both serve the same purpose, and they can each play their parts unsupported. And what is true of these two senses, is true of the other three, allowing for the efficiency of the sense apparatus and for the ease of re-production. Similarly, the idea may be built up of portions derived from more than one sense. [Test whether you can re-collect in terms of all the senses.]

71.—Other Sources of Secondary Units or Ideas.

The five senses supply a fraction only of what generally may go to the formation of a unit. I admired the man, perhaps, for his appearance, and...
the notion of him is represented by a secondary gaze or by a feeling of admiration. His behaviour, it may be, made my lips curl with contempt, and that curl alone is reproduced. He inspired me possibly with disgust, and that feeling may be the part re-developed. He may have set me thinking, and that attitude is likely to re-enact itself. He may have angered me or pleased me, and these feelings are perhaps repeated more or less completely. Indeed, emotions and feelings are the usual stimuli to the memory. With me, at least, what is usually re-collected is that which is peculiar to the person or which marks his relation to me. [Experimentally test in your own memories.]

As against systems derived from sense elements, some psychologists enumerate certain "inner" characteristics as desires, emotions, volitions and thoughts. It is as if all simple brick structures up to a cottage were called bricks, and were strictly divided off from other brick structures which were called houses, mansions and palaces. If we analyse a desire, hunger for instance, we meet a certain humble or simple feeling which is secondarily connected with the notion that the stomach requires something, with a muscular and nervous uneasiness, and so on. This rooted desire is hence a bare feeling rich in connections and in possible meaning: and, therefore, but slightly more complicated than a passing visual act. We may thus regard a certain object as a curiously shaped closed vessel made of metal and filled with hot water, or, looking beyond its appearance, to its known use, we may call it a foot-warmer. In this manner desires, volitions, emotions, thoughts, and their like, cannot be classed apart; for they are only somewhat more highly developed compounds than common sensations, or, what is the same thing, they are systems rich in possible connections, systems which derive their names, their distinctions and their importance solely from the processes with which they are connected. [Analyse hunger, thirst, fatigue, etc.]

Höffling and others deny independent position to a feeling. "In the province of the feelings nothing is found corresponding to the laws of association of ideas" (Höffling, *Psychology*, 1891, p. 275). Godfernaux and others, on the contrary, lay stress on the driving force of feelings. "If ideas associate, it is because feelings bring them together. In themselves, ideas have no special affinity for each other" (Godfernaux, *Le Sentiment et la Pensée*, 1894, p. 202). And on p. 203 this author concludes generally: "The phenomena of consciousness act and react on each other, and associate among each other like the motor phenomena to which they correspond." Stout (Psychology, 1896, p. 271) says: "Pleasures as such and pains as such are not immediately associated with each other, and it does not appear that they are, properly speaking, associated with presentations or active tendencies." See also Dumas, *L'Association des Idées dans les Passions*, 1891; and Ribot, *La Mémoire Affective*, 1894.

72.—SECONDARY UNITS AND IDEAS WHICH ARE GENERALLY OVERLOOKED.

Let us now deal with a peculiar class of units. Very faint images will be almost certainly overlooked by an ordinary individual who seeks for them, since only with persistent training comes the capacity to detect blurred traces. Yet there is another group of facts which should not be passed over. Along with the same class of grouped systems the same tolerably definite but unag-
gressive images are often re-developed. In many of these cases the images
never give rise to reflection, and cannot be re-developed apart from the com-
binations to which they are attached. They come and go like the shadows
of the clouds on the sea, without leaving any lasting impression. They
generally, among other things, underlie our intuitions with regard to the
appearance or character of those we meet, and our philosophic notions.
There is here relevant re-collection which is only traceable by close in-
spection (sec. 126). [Deliberately watch the stream of thought for these un
aggressive memories.]

73.—Word-Ideas as Such.

Circumstantial re-instatement is always out of the question, and it would
be unwise, therefore, to think that every time I hear, for instance, the voice
of my mother I re-collect everything I know of her. But partial re-
statement of a context, in the common acception of that term, is equally about
as a rule. I thus peruse a paragraph of twenty one lines without chang-
ing on a single picture. Such words even as dingyman, garden party, botan,
curate, Herrick, High Churchman, Worcestershire are apparently unac-
panied. With terms like lofty, mean, pleased, disgusted, slow, quick, sharp,
sour, thick, thin, thunder, lightning, love, hate, anger, tears, etc., I observe
usually a distinct and special way of pronunciation. There is residual
action or feeling in each of the words, a fact which makes men think that
such a fair-sounding word as thunder has thunder in it, when it is the
manner of utterance which alone supplies the grimness and the force. How-
ever, when we read quickly, the variety of emphasis is almost lost. [Is
it?] In words of common occurrence no distinctive accompaniment is
observable. Take for instance the words by themselves in "it is the manner
of utterance which alone supplies the grimness and the force." In this
sentence the majority of the terms have but a familiar sound and no more.
They are word-units, the expression "utterance," no more and no less
than the expression "which." [Experimentally test step by step.]

Taine (On Intelligence, 1871, p. 4) holds a different view: "However briefly we retain
the word, the image to which it corresponds commences to form; the image accompanies
the word in a nascent state, and, though not actually formed, acts on us as if it were."
Stout's view will be found in his Psychology, II, pp. 78-96.

74.—Words Rich and Poor in Meaning.

The apparently meaningless words just referred to are empty and mean-
ingless as such. They display a special content only when we pursue our
inquiry, as when we ask "What do you mean by 'manner'?" Then,
according to circumstances, a multiplicity of details is disclosed. But this
question merits closer consideration. [Ask yourself the question as regards
all the words in this paragraph.]

When we first meet with such a term as "philosophy," the term means
almost nothing to us; it is a word we read, but know nothing about. We
may never strive to understand its meaning, and then the word to the end of our life has merely a familiar ring. It is otherwise with the philosopher who has read and studied the term in innumerable contexts. The word is highly expressive for him; that is to say, while usually lacking distinctive accompaniment, it is possible for him, if he so desires, to gather round it a varied mass of relevant matter. It is to this we refer when we say that a word is rich in meaning. On the contrary, when we speak of a word being poor in meaning, we are not thinking principally of the immediate absence of detail, but of the impossibility of making of it, without further study, a centre from which radiate many stately avenues of thought. A word rich in meaning can be attached to many systems; a word poor in meaning has scarcely any relevant connections. To put it briefly, by neglecting the process of frequently hunting up the various relations of a word which is rich in meaning to us, its significance, through forgetfulness, is gradually, perhaps unsuspectingly, reduced until the word resembles an empty picture frame. [Test experimentally.]

75.—Why Secondary Units or Idées Illud to Have Little Content.

The stream of attention in those who are awake, proceeds equably in strength and swiftness, and is amenable but to slight alterations. (Ch. 2.) At the same time our needs frequently outrun our immediate power of satisfying them in full. (Ch. 7.) Hence a tendency develops to economise the attention, and, as a result, we attend, generally speaking, to things no more than we are compelled to. This process explains the relative emptiness of words and imagery. Instead of re-membering all I could about the man, I only re-produced his face. Instead of re-producing his face distinctly, I re-produced a faint patch. Instead of re-developing a faint patch, I only gave individuality to the name. And lastly, the mere name alone, given a context, must suffice. Thus, through anxiety to report progress, units are steadily divested of detail, that is to say, we suppress the irrelevant images or take no measures to re-call them. By a similarly effective process the immediate meaning of words is gradually reduced till, as we have seen, it often reaches the zero point. According as we imagine our nervous system changed, so these results would be different, for needs, theoretically regarded, are not of necessity infinite in their exactions, while attention may be indefinite, or distributed unequally in time, so as at once to satisfy any need. As Stout (Manual, 1890, p. 407) says: "Only so much need be revived as may be required by the dominant interest of the moment." [Test experimentally.]

76.—Secondary Units or Idées reflect Individual Situations.

I have re-developed in steady succession nearly all my friends and acquaintances. [Do the same.] In a similar way I have thought of various objects with which I am familiar. [Do the same.] In the first of those cases every image reflected an individual situation. [Is this so with
you?] In no instance was there traceable any superimposing of images, a truth which can be experimentally tested. I do not see a face which is looking in no particular direction; I see one looking in the same direction as on a particular occasion. With repeated observation new items are added to the old until almost every detail of the face can be re-developed. Hence the completeness is the result of varied activity and not of superimposition through humdrum repetition. When, on the other hand, familiarity and varied situations induce neglect of detail, then it is some blurred form of an individual image with which we are dealing. As with persons, so with things. Neither experiment nor observation yields generic images. Indeed, as we have seen in the last section, ideas which are frequently employed, will, as a rule, lack accompanying imagery. Fancy a generic image for "Universe," "general idea," or "everything"! Their meaning lies rather, as we shall see, in the connection which the words can enter into with others and in the selected points which differentiate the meaning of terms. [Carefully test the whole paragraph.]

76a,—General Ideas.

"When we use the word battle, the mind runs over the train of countless acts, from the beginning of that operation to the end; and it does this so rapidly, that the ideas are all clustered into one, which it calls a battle. In like manner, it clusters a series of battles, and all the intermediate operations, into one idea, and calls it a campaign; also several campaigns into one idea, and calls it a war." (James Mill, _Analysis_, 1869, i, pp. 329-33.) The despatch, if Mill be correct, must be rapid beyond all imagination; for while the lightning is not so swift but that we seemingly collect a faint impression of motion, yet with these complex ideas, the most painstaking and prolonged inspection reveals not as much as would a twilit in the heart of a thick fog. There are several objections to this theory which follows along the line of Dugald Stewart's doctrine. (1) We cannot review past scenes more quickly than can the senses which keep us in touch with the outer world. An attempt to see things with much greater speed than usual, ends in vagueness, confusion and fatigue, and the same applies to secondary vision. (See, however, Egger, _Le Parole Intérieure_, 1881.) I re-instate related happenings with almost machine-like regularity and speed, about two-thirds of a second passing between picture and picture, or idea and idea, when they form no sequence. Endeavours to increase the rate of motion are fruitless [test this], a tendency to haste producing a fall in the quantity of what is imagined, or introducing confusion and fatigue. Hence, the known flow of imagery being measurable, we are totally opposed to admitting a rate of ideation which is vastly beyond anything that is verifiable. (2) The elder Mill's theory implies a perfect memory, and yet the overwhelming mass of what is at first re-membered, is very soon forgotten. This is made evident in the observation that if I had asked Mill for an explicit statement of his idea of a battle, I should have obtained a few grains of value instead of mountains of information. Similarly, as time passes, the words Thirty Years' War may have lost their entire contents. To this it would be idle to answer that all the details gallop by as a body and are re-collected as such, while they are otherwise unavailable for use. (3) Compression can only proceed when there is some thing to be compressed. "Smith's hat," "the top of Mont Blanc" or "yesterday's buttonhole," appear in secondary as in primary systems, and these would hence be the idea or unit of thought. So also is it with two or three objects; for these are readily re-produced, though no gradual increase in compression is traceable. On every ground, then, the compression theory must be dismissed. [Experiment as to compression.]

The subject of general ideas has formed an important centre of discussion. Locke quaintly sums up the matter as regards the general notion of a triangle: "The general
idea of a triangle must be neither oblique nor rectangle, neither equilateral, equiangular, nor scalene; but all and none of these at once (Human Understanding, 1689, bk. 4, ch. 7, sec. 9). Berkeley, in his Introduction to his Treatise, 1710, makes merry on Locke, contending on his part, that "an idea which, considered in itself, is particular, becomes general by being made to represent or stand for all other particular ideas of the same sort (ibid., sec. 12). Hume, agreeing with Berkeley, resolved the riddle as follows: "All general ideas are nothing but particular ones, annexed to a certain term, which gives them a more extensive signification, and makes them recall upon occasion other individuals, which are similar to them" (Treatise, 1739, part 1, sec. 7). A favourite modern theory is the one propagated by Galton, to the effect that a generic image resembles a composite photograph. We persuade, for instance, thirty mathematicians to oblige us; and we photograph them each, one after the other, on one plate, when the developed photograph will show a typical mathematician. Similarly we proceed with thirty costermongers, and the difference between the characteristics of the two professions are in that manner supposed to be revealed. In accordance with this Galton tells us that "our general impressions are founded upon blended memories" (Inquiries into Human Faculty, 1883, p. 349). Here is a full description of Galton's theory as understood by Huxley, Hume, 1879, pp. 946-950. "Now, when several complex impressions which are more or less different from one another—let us say that out of ten impressions in each, six are the same in all, and four are different from all the rest—are successively presented to the mind, it is easy to see what must be the nature of the result. The repetition of the six similar impressions will strengthen the six corresponding elements of the complex idea, which will therefore acquire greater vividness; while the four differing impressions of each will not only acquire no greater strength than they had at first, but, in accordance with the law of association, they all tend to appear at once, and will thus neutralise one another. Thus our ideas of single complex impressions are incomplete in one way, and those of numerous, more or less similar, complex impressions are incomplete in another way; that is to say, they are generic, not specific. And hence it follows, that our ideas of the impressions in question are not, in the strict sense of the word, copies of those impressions; while, at the same time, they may exist in the mind independently of language. The generic ideas which are formed from several similar, but not identical, complex experiences are what are commonly called abstract or general ideas." [What will be the generic image of a person whom you have seen four times, facing four directions?] In criticism it is but necessary to refer to the remarks made above on James Mill, and to appeal to deliberate experiment which is here open. Whether, in some sense, there is truth in the contention, is another matter. By implication, we have dissented in the text from Taine (On Intelligence, 1871, p. 397); from Prof. Ward (Psychology, 1886, p. 62, col. 1), who supports Galton, as also from Dr. Stout (Manual, 1899, pp. 406-7), who agrees with Prof. Ward. Sully (Human Mind, 1892, i, pp. 415-6), while agreeing with Galton, yet holds that a general idea is a generic image plus the clear consciousness that it represents a class of things.

We saw in sec. 69 how, with time, images lose much of their detail. What is true of the example given in the section referred to, holds very generally. For instance, when some one chances to mention horses to me, I think of some particular one I have known. In time the image becomes not only more and more patchy and scrappy, but the history of the image also fades till it disappears. When, at this stage, the patch of shady black—an apology for a horse—is recalled on thinking of a horse, we imagine, or are tempted to imagine, that this shadowy individual is the result of superimposition of all the horses we have seen, as in composite photography. In my view, these images cease to be connected with a particular situation, and are degraded individual images. [Experiments]

"The images of our past experiences, of whatever nature they may be, visual or verbal, blurred and dim, vivid and distinct, abstract or concrete, need not be memory images, in the strictest sense of that word. That is, they need not rise before the mind in a marginal fringe or context of concomitant circumstances, which mean for us their date. They may be mere conceptions, floating pictures of an object, or of its type or class" (James, Talks to philosophers, 1899, p. 144)."
Language being the chief medium by means of which we absorb the wisdom of our fellows, it plays necessarily an important part in the secondary life. Yet that must not blind us to the fact that thought is not always dressed in words, but repeatedly roves about garbless. Thus walking through the meadows, I turn to examine their appearance. My eyes fasten on a large variety of objects known and unknown. Though clearly observing what I am otherwise acquainted with, yet owing partly to the swiftness of membering, thought remains wordless. I admire this flower; I linger over that patch of tall grass; I follow the outlines of the trees; I observe the course of the brook, and note its silvery with the sinking light of the sun; I note the cows grazing, or resting, or driving the flies off, or turning their great eyes on me. My interest in the scene is vivid and continuous, and my brain is busily engaged. [Record such instances.] We already saw in ch. 2 that primary and secondary systems imply attention and are one with thought. How much more true is this where wonder, admiration, reflection, absorption, close observation, fond lingering, are added. Thought is involved in the faintest dawn of sensibility as much as in the formation of the most abstract proposition. It is one with what is great and small, humble and proud.

To test the possibility of wordless thought I enact a pantomime in the imagination. [Experiment in this direction.] I imagine an elastic cord to which is attached a dummy baby. I swing the latter about an imaginary room, and observe how it strikes against the floor, walls, ceiling and furniture. I approach an imaginary window (it is on the third floor) and dance the doll about. Now it touches the road below; now it bounces up to the sky. I vary the direction and the rate of the motion constantly. Now the elastic band describes a tremendous circle; now it swings to and fro; now up and down. This fooling is unaccompanied by words. I think of all kinds of things to do: I vary the conditions incessantly; I imagine new possibilities; yet all without verbal assistance. Here I am not, as in the meadows, guided by what is outside me; nor am I merely enacting some scene which I re-develop. I project a series of events on the screen of the imagination. I construct combinations. Here is the higher kind of thought applied frivolously, the creative faculty in action.

Sustained speechless thought is not frequent. [Test this.] Nevertheless, whenever we watch a process, as in chemistry or in mechanics; whenever we observe some person or issue; whenever we tentatively experiment in thought or in fact, we are apt for a considerable period to dispense with words. [Verify this.] Such speechlessness is not by any means rare. An ordinary conversation, for instance, is not sufficient to exhaust the normal demands on the attention: our eyes, as a consequence, wander, alighting now on this object, now on that. Hence the restlessness so commonly observable. Perhaps, while talking, we study the construction of the piano, its shape, colour, size; or our eyes rest consecutively on the pictures in the room. [Verify.]

Note, for instance, a number of individuals at ease [observe at first hand], or better still, observe closely, without being observed, the eye movements of a person not specially engaged. So quickly do the eyeballs turn to right and left, upwards and downwards, that it becomes painful and confusing to keep pace with them. Just as a bell in the hand of a quicksilver-tempered master speaks to the servant of good humour, of lassiness, of indifference, of fatigue, of irritability, of anger, of fury, and so on, so the eye movements form a reflex of passing thought. Now there is a slow excursion to the right, then a quick come-and-go movement to the left, indicating hesitation; now the gaze is firmly fixed, pointing to interest; now the eyes seem drawn to an object, arguing curiosity; now they are rapidly surveying an object, and now they indolently move about as if in search of something. That these swift turnings to and fro are not mechanical, we can easily decide by self-observation; that they are what they appear to be, i.e., intellectual processes, we can determine in the same manner. However carefully I analyse my states under such circumstances, I can see no reason to doubt that there is nothing to differentiate speechless eye movement thought from the severest intellectual exercises.
elements in both are precisely alike. Experiment in this matter, is, of course, not difficult, for any friend or fellow student should be willing to have his eyes watched while we pass and repass a hand or some object before him. These facts have an important genetic or developmental bearing. An infant about fifteen months old certainly behaves somewhat like an adult at ease. His leg movements, his hand movements, his eye movements and his play generally, indicate that topical reaction is common with him. Doubt, belief, desire, will, want, hesitation, judgment and similar states, can apparently be traced. [Can they?]

This means that a child who is not yet initiated into the mysteries of language, thinks briskly nevertheless. By observing these outward expressions of an inner spiritual being in man and child, we ought to approach a reasonably safe interpretation of child thought. It is superfluous perhaps to mention that the highest types of apes show similar eye movements (sec. 233), and that animal intelligence generally is capable of being investigated as we have proposed to investigate the child’s individuality. In this section our chief interest in these swift eye movements lies in the fact that language is excluded by reason of that very swiftness. Hence thought without words and with occasional words is normal.

Max Müller (Three Lectures on the Science of Thought, 1888) apparently opposes our view. He says: “We think in names and in names only” (p. 50). “We may see a dog, but if we ask ourselves what it is, if we want to know what we see, we can answer by the name ‘dog’ only” (p. 56). “May I make the modest request that some philosopher by profession should give us a definition what language is without reason, or reason without language?” (p. vi). “We can as little think without words as we can breathe without lungs” (p. 47). But the learned philologist is scarcely consistent, as we shall now see. “If there is no such thing as a mere name, neither is there such a thing as a mere thought or a mere concept. The two are one and inseparable” (p. 50). “If we mean by thinking, perceiving, enjoying, remembering, fearing, loving, and all the rest, we have no grounds for denying animals, particularly the higher animals, the possession of these qualities” (p. 93). “They [animals] may think in their own way. Their way of thinking may be, for all we know, more perfect than our own... I cannot allow that they think, if we define thinking by speaking” (p. 94). “By long usage speech has become so abbreviated that, as with mathematical formulas, one sign or letter may comprehend long trains of reasoning” (p. 49). “Holding up three fingers is as good a sign for the addition of one, one, one, as the sound of three. Shaking the fist in the face is as expressive as saying ‘Don’t!’” (p. 93). And to crown all: “Thinking is nothing but speaking minus words” (pr 27 of the attached correspondence). Cf. Müller’s larger work, The Science of Thought, 1888.

Galton’s letters in the correspondence bear out our contention. It must not be forgotten that WORDS ARE ONLY VISUAL, AUDIBLE OR MOTILE IMAGES.

See also Ribot, Enquête sur les Idées Générales, 1891, and L’Evolution des Idées Générales; 1897; and Marchesini, Sur les Idées Générales, 1893.

77.—RE-PRODUCTION OF MOTION AND DETAIL.

The footprints of economisation are observable in every direction. In theory and speculation one may assume in any instance a large quantity of compressed, of suppressed or of half-noticed detail; but in practice and experiment we discover nothing of the kind. For example, I know a certain large office intimately. If I so wish, I can traverse in thought many of its passages, rooms and staircases. In ordinary thinking, however, the notion of the journey between brick walls, is expressed by a fleeting picture,—a fraction of the whole space traversed. [How is this

* It would be interesting to study a case of loss of language with non-suppression of thought.
with you! Thus when I think of a certain person whom I saw cross the road, I have in view but a certain insignificant stage of the total act. So a running match which I witnessed, is represented only by a few snapshot photographs. Or to take a special instance, I am in a train, engaged in watching the passing-by of objects, for the purpose of re-producing the objects as moving. I cannot re-call afterwards all I had observed. I seem to reproduce faintly the movement attended to in watching the appearance and disappearance of the telegraph poles which border the line, but even in this I am assisted by the extreme simplicity of the poles and wires as compared with the houses and trees, which I find myself unable to reproduce in the same way. We do not, then, mechanically follow in thought the development of a series of objects in motion. A few momentary impressions form the limit of what men generally obtain, our vision being kinetoscopic, but our imagery barely photographic.

As with movement, so with quantity generally. If we think of a walk down a certain road, we do not pass in review all that we have observed there. A single inward glance may suffice, or perhaps this or that shop is portrayed. Similarly when we picture a day’s stay in a certain town, a view here and there presents itself, with nearly the whole of the detail omitted. So when we think of our journey round the world, or of the Hundred Years’ War of which we have read, casual strips are alone re-developed. As a single picture, therefore, is reduced to a doubtful shadow, so quantities of pictures, stationary or in motion, are in ordinary thought equally deprived of almost their total contents. Possibility of the revival of detail, when necessary, takes the place of mechanical and wholesale re-production; and when such revival is not encouraged, a solitary and isolated shred of an image or a feeling constitutes sometimes our only secondary possession. The quantity collected at any time is hence not in direct proportion to the contents of the past events. [How good is your memory?]

Since the process of economisation is teleological and not mechanical, we must only seek for consistency in principle. Thus when thinking of mammals, there often occurs to me, as an accompaniment, the cast of a young hippopotamus. This image is, of course, partly irrelevant and wholly unnecessary. Often, again, we think of a special image, because the re-collection of that, e.g., a certain kangaroo in a certain place, assures us that any feature which we are in search of may be re-developed. For such reasons images are frequently unnecessary and often indirectly relevant. [Bird, fish, dog, mat, tree, door, walk, fly, box, picture, sand, lan.]—what images were observed by you as you read the preceding words? (Go now through the list deliberately.)

To return from our digression as to redundant imagery. In walking up a hill, my attention is occupied with a certain oak tree which I am slowly approaching. [Test.] If the movement of my limbs is continuous, I have collected apparently a huge number of pictures of that tree, ranging from initial faintness and meagre detail to growing vividness and rich
Systems as Need-Satisfying

This mechanical view is incorrect, for observation is casual and not continuous, since the focussing process is more or less irregular. [Let carefully look about you.] Assuming continuity, however, we note that the vastly overwhelming proportion of what has been certainly observed, cannot be re-developed. Only this or that view recurs, owing probably to the fact that retention requires a degree of attention which is not continuously at our disposal. [Note how far you re-member fleeting of creations.] For days we may thus absorb the many sights we see and the sounds we hear, with much the same result. That is to say, while continuous observation is normal, continuous re-collection of what is so observed is not normal to the human structure (Sec. 117).

78—Observation is Tillogically Determined.

If we wish to measure quantitatively what we re-member, we must first determine the quantity which we observe. Suppose I look for a few moments at a good photograph—a foot square—of a portion of the Thames embankment in London. [Repeat with some such future.] After a few seconds I look again, and I then detect details which escaped my first inspection. In this way repeated analysis has ever fresh surprises in store. This visual process is obviously at total variance with the process of photography, where every exposure yields the same outlines, and where repetition of exposure, or substitution of camera, leaves the situation unaltered. Let us exchange the photograph for a piece of nature. Sitting before a clump of trees, constant attentional readjustment, like a stream, unceasingly changes the matter of observation. [Repeat.] What is seen at the first glance, is, therefore, trying when compared to the total to be observed, while the imperfection of the attention at any one moment can best be tested by turning to an apparently featureless small object, such as a leaf, with the intention of exhausting the details to be assimilated. [First.]

Further, the process of economisation evidently applies to observation as well as to re-collection. Catching sight of a blue helmet, I say to myself without further troubling. This is a policeman. Seeing a hand, I forthwith recognise, without further analysis, that it belongs to an acquaintance of mine. Hence, to speak quite generally, we see and observe no more than we need. We assume an airy attitude towards all that is indifferent. [How far do you agree?]

Looking at matters in this light, we are driven to an additional conclusion we mainly see and observe what we have seen and observed before, and infinitely little beyond (Sec. 118). We are not walking cameras which impartially photograph everything within view; we rather observe the little we have observed in the past, ignoring the vast mass which has not been pointed out to us or to which we have not specially attended. Attention is an antiquarian and strongly conservative.
Observation procures little, and of that little, most is forgotten (sec. 114).

When we come to what is re-developed, we encounter but a sorry remnant, an ocean shrivelled into a pond. The number of incidents has shrunk alarmingly, and the particulars of these incidents have almost gone. Seven hundred re-developed details of a seven months' journey form a poor sample indeed of our power of retention, and a hundred details, embracing the first nine years of our life, present even a more meagre exhibition. Yet thinking of yesterday's events, I can nearly double in details the journey referred to; and taking an actual day with its events photographed, the figure may be multiplied a hundred-fold (sec. 114). As we are not now discussing the problem of memory, we need only note that we cannot expect images to be photographic copies of objects and events (sec. 117).

80.—Every secondary unit or idea represents a set of activities, and cannot be stored.

I wondered whether I had previously seen a particular face, and a face occurred to the memory. That face, as we have learnt, did not bear of necessity an exact resemblance to reality. Is that re-developed view, we may now ask, an element, a simple something? The complexity of our organ of sight is well known to the student; but it is only latter-day physiology which has conclusively shown that the complexity continues right up to the brain centres. The nervous system is hence not comparable with a telegraphic net work; it must rather be thought of as a vast factory. The simple ether waves beat against the eyes, and that event is followed by a series of complex transformations. Though in the primary process, the last step depends on the first, yet when the change is once initiated by the latter, the former may be produced independently by a central stimulus. Hence visual re-collection, or what corresponds to it physiologically, is independent of the sense apparatus; for, in strictness, its material is not sense produced. On the physiological plane, therefore, the re-collected face is the embodiment of a complicated set of activities.

Accepting this point of view we are able to deal with one or two matters of importance. The absence of detail in the re-collected face, for instance, is not an accident which may be repaired by closer attention. The face we see is a poor one; and any other face would be a different one. We are not concerned with something which remains ever the same, whether we look or not, or whether we are far removed from it or near. There exists no face apart from the one we see at any time. Hence any change in features is a change in face; or, physiologically speaking, the acts expressing the two sights are separate and different acts.

We cannot, therefore, speak of images as presentations, as things posing before us like a model before an artist. An image is like the painter's Madonna or the sculptor's Diana: it is the result of delicate workmanship.
The fading Madonna is not the same as was the newly painted one; and the faded Madonna shows little resemblance to the original. For the same reason every image, though it be easily executed, is, strictly speaking, an art-product, and every stateable change is a real change. Hence images are not presented to us, except by licence of speech, and consequently the doctrine that images are presentations appears unfounded. (Sec. 177.)

Such being the case, we cannot agree that images may retire and persist in a faint form, for such images, continue as they may, would be new images as would be the Madonna if colours and outlines were blurred. Similarly we cannot give our adhesion to the opinion that everything once observed persists, screened as it were by the few images present at any time. A screened image is a different thing from an unscreened one and appeals differently to us, and hence the continuous existence of one would in no way explain the continuous existence or re-development of the other. Furthermore, the process of economisation, together with the corrosive effects of oblivion, produce incessant changes and transformations which tell wholly against a secondary shelf whereon all images are ranged and preserved in a faultless condition. [Note the effect of economisation and oblivion.] Thus Wundt (Psychologie, 1893, ii, p. 460) rightly reasons against Herbart that every idea is composed of manifold elements, and represents on each occasion a new process. Similarly Hodgson (Metaphysic of Experience, 1898, i, p. 128) expresses himself emphatically: “Consciousness is not given to us in isolated atoms. Its simplest portion is a complex state, its smallest portion is a process.”

The doctrine of presentations which is here criticised is in England held specially by Ward and Stout. Ward, in addition, favours “the perfectly conceivable hypothesis of infinitesimal presentations so faint as to elude discrimination” (Psychology, 1866, p. 48, col. 2). The objections urged against James Mill’s swift thinking apply here. As we can follow the brightness of the noon day fading into night, so should we be able to trace the sinking, simplification or diffusion of presentations. The distance from measurable to infinitesimal ought to be describable by more than a blank. In experimenting I can detect no such process in calling up or dismissing ideas.

Brentano, who is followed by Stout, distinguishes sharply between the act of presentation and the content of presentation, e.g., between hearing and what is heard. To me this distinction appears untenable, as would be the suggestion that one could distinguish between the act of a stone falling and the stone which is falling. The act of falling only means that we see a stone and other objects, the stone occupying different positions from moment to moment. And so the act of hearing can only mean that we think of the thing heard in relation to what is connected with it, there being in both cases nothing but concrete events or contents of presentation. An act of presentation, in short, is something presented. It is a misfortune for psychology that men with anti-scientific interests like Brentano, profess to be psychologists, and champion opinions on the subject that have no real psychological value. Another distinction which Brentano makes is that between content of presentation and object of presentation, and here also Stout unhappily follows. It is true that ordinarily we only have incomplete or unexhausted ideas; but these unexhausted ideas are still the objects, or, if they are not, then we are landed in the position that we know nothing whatever of objects, the word having the meaning of an undetermined X. Either the world as seen at any time is the world or part of it, or the world is absolutely unknown to us. An object of presentation, like an act of presentation, must
be a presentation, an event, a system of elements,—for an inferred exhausted compound
is no more—or else it is nothing at all. (Sec. 198.)

One cannot help feeling that the only motive for these theories is the desire to find
room for a soul that stands and acts apart from the world, and to which the world is
presented. How different is the whole-hearted piety of men like Hartley, Brown and
Abercrombie, who keep second thoughts out of their psychology! A clear exposition of
Brentano's doctrine is to be found in Twardowsky, Inhalt und Gegenstand der Vorstel-
lungen, 1894.

We may here refer again to Herbart. Being of a philosophic turn of mind, conversant
with the theory of music and fascinated by the simplicity of the first principles of physics,
he determined upon a mind scheme closely corresponding to the matter scheme he was
acquainted with (Psychologie, 1824, i, p. 325). In physics we have only matter and
motion, hence Herbart allows only for ideas and their movements. "Instead of gravi-
tation . . . we have the natural and constant striving upward of all ideas" (ibid, p. 326).
"Psychology," he also says, "has some resemblance to physiology; as the latter con-
structs the body out of fibres, so the former constructs the mind out of series of preenta-
tions" (ibid, i, p. 192). Herbart was well acquainted with the association theory (ibid,
i, p. 193), and only complained that Associationists did not mechanically explain the
process of association. Every idea, according to him, strains to enter and to remain in
consciousness; but succeeds only passingly on account of its brother ideas which are
similarly placed. Hence "as far as the movement of ideas is concerned, we distinguish
those which are sinking, those which are freely rising, those which are freely standing,
and those which are reproduced" (Encyclopædie, 1830, p. 308). For this reason ideas
are never forgotten, never out of consciousness (Lehrbuch, p. 18) and never resting; but,
at worst, blurred, repressed and eager to come forward (Psychologie, i, p. 349). Nor
does an idea disdain to lend or receive help, for it "always tends to bring with it that
which is related to it by any kind of assimilations or complications" (ibid, i, p. 433).
In this way single ideas are supported by and fit into presentational masses, such as are
understood by words like "government" or "church" (ibid, ii, p. 192). In short, the
struggle between the ideas forms the mathematically measurable play of thought. Here
is a simple theory, meant to be all-embracing; but without any positive value. All is
fiction, from beginning to end. The floating superstitions of the street, except as regards
faculties or powers, are baptised with awe-inspiring names. What are masses of ideas from
a scientific point of view? How are we to weigh these masses? And if these masses are
indeterminable, or not yet determined, what becomes of psychology? Hence, as we
expected, Herbart throws no perceptible light on any of the problems raised in this book.
Had he come at the mature stage instead of at the birth of psychology, his comprehensive
mind might have worked wonders. As it is, his failure is another warning to those who
ignore the study of facts.

81.—Sense Impressions are One with Images.

If our conception of the complex origin of an image be correct, an im-
portant conclusion follows. We have thus far spoken of images as if they
were strictly distinguishable from so-called sense impressions; but this
difference seems gratuitously assumed. The so-called image and the so-
called sense-impression, on the physiological plane, are both primarily
traceable to certain central changes, the stimulation of which centres must
be indifferent to us in this place. It follows that what is observed and
what is imagined are of one kind and are one thing. Hence the word
image or sensation, apart from convenience, is applicable to every fact with-
out exception, and, therefore, to the material of observation, and hence, too,
all we have said as holding of secondary units holds also of primary ones.
An additional consideration may strengthen the above deduction. We have insisted that, roughly speaking, we only see what we have seen before. If that be so, memory plays a crucial part in observation. We observe what we observe, because of memory, previous thought formations leading us as if we were blind. Memory and observation are, therefore, inextricably blended. In reading, for instance, we partly see and partly redevelop the words, while the very seeing of the letters depends on familiarity. (Sec. 107.)

What is observed and what is re-membered are, for the above reason, distinguished by secondary characteristics alone. That which we speak of as re-membered, usually displays fewer details, possesses no rich setting, offers no continuous environment for analysis as does what is observed, and may be generally dismissed at will. For instance, I re-member a poster on a hoarding. The imaged poster appears tolerably real, though close scrutiny shows how soon we have exhausted the imaged details; but against this must be set the fact that the immediate environment of the poster, i.e., other posters, is very faint, while the remoter environment, i.e., houses, etc., is untraceable (sec. 124). Certain difficulties, which do not appertain to our immediate inquiry, compel us, however, to seek for a more fundamental distinction, and that we find in the schematic relation of primary and secondary systems. In this way we define the nature of reality, memory, imagination and dream-life, by establishing their positions in the plan of things (sec. 124).

82.—Movement and Thought.

If our needs and the machinery for satisfying them, are (what is called) physiologically determined, and if images can best be understood when physiologically considered, then the realm of images must be further extended. Our movements are the result of complex processes as are our images, and the facts of economisation, memory and attention apply equally to thought and movement. The process, in both cases, is also complex as well as adapted towards an end. We may, therefore, legitimately speak of movements constituting intelligent acts and being units, since units are but the particles of intelligent processes. For similar reasons, the lower activities of the stomach, heart, liver, etc., must, in the last resort, be regarded as of the same nature as those activities which we have hitherto taken into consideration. The apparent breach between matter and mind, which makes such a conclusion irrational, must be thought of as apparent only. (Ch. 8.)

83.—Units and Trains of Units.

Our reasoning has thus far proceeded on the principle of one word, one idea. We must, however, here ask ourselves whether such a principle will survive the hardships of an examination, or whether the word "idea" is not merely a term of convenience. Men have talked of trains of units or
ideas as if they were dealing with trains consisting of securely-coupled railway carriages; and in this light a train of thought would be constituted by so many separate units or ideas. We have spoken of a re-collected face as representing one unit, and we have also referred to incidents as represented by single units. Accordingly, terms such as London, England or Europe may be considered as single units, each of which, as we know, is not, at any time, a mass of details, but suggests some relevant aspect. No more is thought of generally than the situation necessitates. [Recalled objects as a whole, then portions of them.]

Stout contends "(1) that any reproduction which can be called an idea, must have sufficient independence to be capable of forming a distinct link in a train of thought; (2) that it must be the thought of an object, such as a thing, quality, relation, or event, and not a mere crude sensation, however faint; (3) that just because an idea differs from an actual perception, ideal reproduction is always of a partial and modified character" (Manual, 1898, p. 94).

84.—THE NATURE OF LANGUAGE.

The nature of reasoned language introduces us to a fresh problem of the same character. It might be thought that since each word represents a unit or idea, a sentence of ten words, e.g., "The pen with which I write is an obedient servant," is a symbol for ten units strung together like so many beads. The falsity of such a view is obvious, and as language is the chief instrument of communicated thought, I will here analyse those lingual aspects which belong to our subject.

In language are embodied the distinctions which have been discovered by the human race. While objects, i.e., systems regarded as exhausted, are individual and concrete, language represents, in a less complicated form, a system of signs to designate those objects and their relations. Thus a certain peculiarity strikes us, and we speak of a big face, a big man or a big country. In a similar strain we indicate relations of time, number, quality, connection, comparison, interests, etc. Now it is evident that instead of using two words, such as big man, we can employ the one word giant, and yet the latter term implies but one unit. If we turn to the data, our surmise receives confirmation. Economisation has made us drop the separate emphasis, and yield a single unit in two words, a unit which can be well expressed by one word. Hence terms like tent, hut, cottage, house, mansion, palace, castle, might each be expressed by more than one word. We conclude, then, that while adjectives are sometimes employed to point to a certain property, they, together with the noun they qualify, form frequently a solitary unit or idea. What, again, is true of adjectives, equally holds of adverbs, and of speech generally.

In compound words the above contention is easily verified: In "blackbird" or "black-board," we do not think of a bird or a board which is black; but we have a solitary object in view. So, when we think of Paternoster Row, or of the Prince of Orange, or of Trinity Church, we are evidently not reminded of a paternoster, an orange or a trinity. [What do such
names suggest to you?] By the force of economisation these compounds have become names for single objects, the more primitive meaning of the separate words being neglected. Thus we figuratively speak of a queen having ascended the throne at a certain date, when we neither think of the act of ascending, nor of a throne. Similarly we refer to some one as being the “lion” of the London season, when no image of a lion develops. So even with separate words. “Get away,” “get money,” “get on,” are phrases in which the meaning of “get” differs fundamentally; for we could not paraphrase them, “obtain away,” “obtain money,” “obtain on.” And, finally, the complexity of the object gives its corresponding sign a complex character.

The significance of words is not determined by a rigid standard, and hence the interpretation of language must follow the varied meaning which underlies words. A sentence can thus be thought of as a unit or idea where the totality of words counts for one word, or else as a set of words, the meaning of each of which is counted separately. Especially with the help of the process of economisation do we now understand that word-sentences are something different from haphazard sets of words. It has been said that a melody is more than the separate sounds of which it is composed. This is far truer of words, for in the word-sentence the meaning of each separate word may be wholly lost. It is as if the separate sounds were immaterial to the melody. Leaving aside the dynamic aspect, we understand now the inner depths of language, as employed by the adult. Whole sentences and paragraphs express but single units. When I, therefore, say “The pen with which I write is an obedient servant,” there is no fastening together of ten separate units into a train. We have rather before us an organic complex which defies mechanical interpretation. In some language one word might do the work of the ten. (Sec. 215.)

85.—What is a Secondary Unit or an Idea?

Take the observational attitude. My eyes sweep carelessly along the façade of some imaged mansion. Is this total act, lasting some time, to be thought of as one unit or as a train of units? And if thought of as a train, must not, for the same reason, a single imaged face be equally regarded as a train of units or ideas? And if so, where is the line to be drawn? Now let us first be clear as to the nature of this total act. It consisted of no more than appeared on the surface. I did not necessarily think implicitly or explicitly, of the whole history of architecture, of all buildings I had seen, and all that was related to mansions. I did not think of all that the house might reveal to the five senses, and of the reactions which such revelations might bring about. There were colour, shape, depth, obvious relations of parts and a few other reactions. This normal simplicity, so different from what an exhaustive analysis of possible relations would yield, must ever be kept in view. Yet even this residue must be considered as a complex. The house, as a system of lines, is only seen, to begin with, because we
have seen other houses. The various spatial and other relations, however readily discerned, imply special processes. Thus when we push the inquiry further, the very fact of sight argues a certain complexity (sec. 182). Moreover, if we extend our inquiry to the other senses, an additional problem arises. In the final analysis, it may be surmised, we have only to deal with a nervous shock or a simplified touch system, out of which, by differentiation, the mass of disparate systems is evolved (sec. 189). Every individual act, then, is composed of the same minimal acts, of atoms, we might say. If the colour green, for instance, is seen in three consecutively remembered pictures, we probably have not three greens, but the same kind of act three times repeated. In this sense, the notion of storing images becomes unintelligible. There is increased readiness to perform certain processes which represent certain pictures, and that is the Alpha and Omega of psychology on the question of memory, so far as it concerns us at present. (Sec. 80.)

Strictly speaking, then, we should speak of a process of combination, and not of units and trains of units, nor of perceptions and trains of perceptions. So-called units are all more or less fluid complexes, and hence not easily distinguishable. So-called simple units or ideas resemble, on close inspection, so-called trains of thought, and it is as reasonable to think of storing the latter as the former. The developing of a unit is like the painting of a picture, and a second picture is developed by utilising the material of the first, as the same cards are employed over and over again in building card-houses. Since also the present and the past, the near and the far, are so bewilderingly interwoven, we must think of the forming of units as an organised process, dependent on inherited structure and adaptability.

"The localising and the objectifying of sensation, make up together what we commonly understand by perception" (Sully, Human Mind, 1892, i, p. 207). Sully's whole account in this respect is inorganic. As a rule we no more objectify or localise what is sensed, than we class it among what strikes us as useful, good, beautiful, pleasant, pertinent or what not. In each instance the relevant minimum suffices. As we shall see, when, on smelling violets, I say "I smell violets," I am only dealing with an additional datum which has no thinghood in the ordinary sense about it. So when I assert "Here is an orange," there is no need for scent, taste, hardness, pleasantness, or other associations, to hide themselves behind the skirts of that word. (Sec. 107.)

86.—Summary.

The conclusions we have thus far reached are as follows. There is a process of combination which constitutes intelligent or organised acts and systems. That process is retarded by the incompleteness of both observation and retentiveness, and is vastly simplified by the method of economisation. Observation, memory and organised action, simple and compounded systems, separate words and word-sentences, all imply fictitious antitheses. We can hence understand how long strings of relevant sentences are quickly uttered without the words having any apparent sensory or other accompaniment.
87 — The Dynamics of our Subject.

Though we have concluded that movement, or process, is implied in all sensations and images, or integrals, yet for practical purposes it will be as well to assume here that there are separate units or separated processes. Such a division permits us to glance at the order in which units follow one another, and this undertaking will be the easier because the reader possesses now for his guidance definite notions as to the nature of units or ideas, notions which should enable him to concentrate his attention on the current of thought rather than on the particles of which it is composed. It is only natural that after having indicated the statics of thought—thought at rest—we should proceed to investigate its dynamics—thought in motion.


"Have I seen that face before?" was the question I put to myself, and forthwith, as we saw, the face referred to re-developed. Premising that we are only concerned in this place with what succeeds, rather than with the how of that succession, it will be readily granted that a face identical with the one present was re-produced. We may now vary our question, so as to learn the changing aspects of the problem of succession. I say to myself that I wish to see a somewhat similar face, a similar one, and one extremely like it. So, still experimenting, I try to re-produce some other face, then a dissimilar one, one recently and one not recently thought of, one that is good, beautiful or clever, one that I have seen or thought of in conjunction with it, one gained by re-constituting the re-produced features, by deliberate decomposition of details or by wear of the features; and lastly, I try to think of something much unlike a face. [End, if possible, other phrases.] I succeed in each of the tasks referred to. But let us illustrate some of the above. I look at a person before me, and the image of some one I have not met for some years takes shape. I look once more, and I think of some one whom I occasionally see. I desire to re-produce something recent, and my desire is fulfilled at once, though only a desire existed. So also I attempt to think of something that happened long ago, and an incident covered with the mould of time, is the consequence. Thus, again, I endeavour to call up something unlike the image I am fixing, and after a short struggle I am rewarded. In the same way what is important, what is interesting, what is good, what is beautiful, and the like, are re-produced at pleasure. In truth, only what is utterly unlike entails difficulties. [Test experimentally every step in this paragraph.]

Let me now give a hint, for I cannot do more, of the curious arches which span the chasm between units. If we intend to act at hap-hazard or arbitrarily, we shall observe that at some point of the sensory body a skin sensation develops, and in the customary fashion we move, say, that arm or finger where the sensation is felt. If we intend to continue arbitrary movements, then the process above described repeats itself, unusual movements being rare. There is here, therefore, an intell...
gable sequence: we are ready to act; we are waiting for a sign; accident, always to be relied on in this connection, produces what we want, and we repeat some action familiar to that part, activity being readily initiated in the chosen direction. [Test experimentally.] In arbitrary utterance a chance tendency is likewise exploited; words come to us with the same initial letter, or with the initial letter next in order; and the syllables exhibit a certain calculable length and character. (Sec. 152.) [Test experimentally.]

Relations, similar to those between words or between primary systems, may be observed among images. I look at a person, and my eye happens to rest on the mourning band round his hat. This indicates the point of departure. As I centre the attention on the band, and otherwise ignore the person, the band develops around it another familiar environment in the form of an old friend whom I had not seen for some years, and who wore such a mourning band. Or, again, my attention is arrested by his moustache, and an acquaintance from the country who has such a moustache develops. If we assume that an image represents a process, then it is not difficult to admit that any section of the process, when stimulated, may develop in different familiar directions. [Test the preceding.] Reproduction of what is identical or similar is here apparently explained; a given feature is emphasised, abstracted and permitted to evolve around itself a new environment.

Contiguity, or proximity in space and time, forms no exception to the above. While thinking of a fact, we may, for instance, explore the secondary visual field of which that fact forms a part. [Repeat repeatedly, *]

In this manner the secondary process is developed in certain directions, ending in the re-development of what is contiguous, or rather continuous. Similarly, by re-distributing attention, by sensitising a certain brain area, relations other than spatial are developed, and these prove a stepping stone to further familiar developments along the lines of time and contents. Just as an assumed angry expression suggests anger, so active secondary vision and audition play their parts in restimulating in a new order or in an old, what is visual or audible. In fact, in contiguity as in similarity, the emerging contiguous image implies that something else is being ignored, as secondarily or otherwise exploring a room. Thus change in the line of activity, assimilation in a new direction, or movement of the attention marks both contiguity and similarity. In both instances only the line between the new and the old represents both the new and the old.

The problem of re-producing what is recent is on a somewhat different plane, for here there is no connected process, in the ordinary sense. The stretched string of a violin, when sharply twanged, recoils and visibly vibrates for some time, and so a brain area, when excited, remains for a period in a highly unstable condition. Under these circumstances, *Mavryner (Sur l’Association des Lèvres, 1864) speaks of the law of contiguity or continuity,* p. 52.
memory, as we know from the ease with which we redevelop recent events, is almost as trustworthy and complete as observation, while the momentum is such that unless there is a strong bent in another direction, the recent will again and again appear before the bar of attention, the nascent becoming real, the possible process becoming an actual one. Hence it is common for the recent to come forward uninvited, and to connect itself readily with much that is passing. It is also this high instability that supports and carries along any and every continuous process of thought. Passivity of a kind is all that is required in remembering the recent. (Sec. 11000.) [Remember what is recent]

89—Secondary Complications

Experiments along the line just spoken of incidentally unmask a known fact of the utmost importance psychologically. A few hours ago I looked at a striking pictorial postcard. Desiring to reproduce something which recently took place, that postcard occurs to me. Later on, I repeat the process of wishing to redevelop something recent, and the postcard, for a new reason, has once more returned. The fact is that recency plus postcard becomes one complex, and that the re-collection of the former most easily developed into the latter. We obtain from this the principle of secondary complications, if we agree to give the name of primary complications to those nages and sensations which are connected in observation, remembering that there is no proper division between primary and secondary facts. As will be seen at once, this principle is of commanding influence. Since concepts and ideas are ceaselessly thought of in new relations, secondary complications are becoming continually shaped and strengthened. So sweeping is this factor that it is the principal means of forming scattered sensations and images into an organic network. Without this constant interweaving, the free play of thought would be impossible.

Another instance well illustrates the principle we have been contending for. While viewing a face, I try to think of something unlike it, and a basket occurs to me. When this has once occurred, thinking of what is unlike becomes closely related to the notion of a basket, and the one being reproduced the other develops forthwith. For this reason, I have, in experimenting, to dismiss dozens of these spurious unlikenesses, and on every occasion we must allow for stereotyped complications which have grown out of the experiments themselves. [Try and collect what is unlike.]

Association by contrast, as far as traceable, is explained by the process referred to above. Contrasts, being interesting, are sometimes noted—though in the aggregate not often—and hence secondary complications are originated with the result that thinking of the one extreme, or any extreme,
readily develops, because it involves, the other. Hence the multitude of
hackneyed contrasts—giant-dwarf, high-low, good-bad, bitter-sweet, etc.—
must not be regarded as developing one another in virtue of the contrast;
but rather as closely connected secondary complications, such as sailor-
soldier, life-strife, lover-sweetheart, father-child. [Test experimentally.]

Can I think of what is old, of what is sweet, of what is good, of what is
indifferent, of what is limp, of what is important, of what I hate? [Can
you?] I can, and that in virtue of the fact that the words or the stimulat-
ing units have formerly appeared in connection with what will follow our
question. Unless we assume some such solution, it becomes difficult to
describe what is, on the face of it, so unrelated. Why should the word
"old" be followed by the vision of an aged beggar? or the word "sweet"
by the sight of a piece of preserved ginger? For no other reason ordinarily,
I contend, but because the units of "old" and "beggar" have occurred
in some form or relation previously, and because they constitute, therefore,
a secondary complication. Thus the easy flow of the stream of thought is
due to the myriads of secondary connections which have been constructed.
[Experimentally repeat the preceding.]

Primary and secondary complications are often no sooner formed than they are dis-
solved. To be firmly fixed, they must be repeatedly re-collected. Again, as express
purposes do not generally connect complications, and as a certain looseness and inde-
pendence is valuable for effective thinking, we find that one image is by no means always
followed by one and the same connected image. So also the nature of secondary com-
plications makes it clear that the relative age of an image does not, where normal thought
is concerned, enter into the question. What happened twenty years ago—provided it has been re-developed frequently since—is as likely to emerge as what happened ten
minutes ago.

90.—Development, Excitement and Secondary Complications.

We have thus far dealt with the time relations of two particles of thought,
and we have found it essential to assume that the bulk of units or ideas are but expressions of a few processes, and that the units or ideas do not exist apart from these processes. Since, for instance, the mourning band
of the one man is, psychologically, the same mourning band which is worn
by another, the process of development, or the movement of the attention,
may lead to the re-development of either of the two men. Thus the mourn-
ing band, as such, is but a link and not the reason of the re-production of the
other man. Leaving aside the question of recency and, possibly, of un-
likeness, and there remains but one fundamental method, i.e., that of
development of a process along certain lines of space, time and content—or
content simply—by which any two or more units may be connected.* The
only subsidiary principle of a far-reaching nature which we have discovered—
the fusion of ideas and percepts with ideas or with percepts—is the existence
of secondary complications, making a living whole out of individual uncon-

* Wundt (Psychologie, 1893, ii, pp. 466-75) similarly reduces association to sameness
and contiguity of process.
nected parts. It must be confessed, however, that not until the neural processes, which best express thought, are laid bare by the physiologist, shall we have a truly rounded and scientific explanation of the nature of thought. The objection which will be raised on account of the incommensurability of what is mental and material, may be answered in two ways. First, we have a right to press for a solution of a problem in whatever direction we think it necessary. Secondly, the antithesis between matter and mind, as we have already stated, and as we shall see in ch. 8, may prove to be superficial and transitory.

We have seen that any thought following another in a thought complex is always continuous with some portion of that thought complex, except in the case of neural excitement. Having ascertained the fact of invariable continuity, we may analyse its various aspects and class them, say, as that which is contiguous and that which is similar. Such a classification is, however, a descriptive process which yields no insight into what is fundamental. Let us consider the character of contiguity. With eyes shut, I take a detailed continuous view of the four walls of a certain well known room. While in this example there is continual fading at one end of the picture, as in ordinary vision, there is continual development at the other end, as in a dioramic scene. Here we have a certain sense complex which is connected with a developing sense complex at one point alone, precisely as in ordinary vision. That is to say, what is at the fading end of the picture is in no way contiguous with anything but what immediately adjoins it, and what emerges does so, as in ordinary vision, solely owing to the inward sweep of the eye. When development assumes the form just referred to, we speak of association by contiguity. Consider now a case of similarity. I look at a person and my attention accidentally alights upon the black band around his hat. Everything now fades except the band, and around that a new human figure develops. When this happens, men say that we have a case of association by similarity, one man suggesting the other because of the likeness between them. As a matter of fact, the two examples exhibit precisely the same features, i.e., while one portion fades another develops. In strictness, then, it is wisest to abandon the older artificial classification into what is contiguous and what is similar, and simply recognise the fact of continuity. This course is the more reasonable, since, on the old lines, we are bound to admit a third class of association—association by identity. For instance, I may repeat some new sound. Here the second sound is not connected by contiguity with the first, since it has not been repeated before, nor is it connected by similarity, for the two sounds are of an identical character. We may, indeed, say that the desire to repeat is here the ground for the repetition; but, then, we may also say that the desire to obtain what is similar or contiguous is the ground for such similarity and contiguity appearing. However, we can proceed further: when the demand, say, is made, “Recall X. and some one like him,” we have similarity; but what happens when we say “Recall X., Y., Z.,” or “Recall the members of a Committee.” In the second case Y. is not
necessarily connected with \( X \) by either contiguity, similarity or identity, \( X \) being unproductive of associations, and \( Y \) being directly connected with the desire to recall a member of its class.

If the above analysis be correct, we can readily see that no association or suggestion of any kind explains the flow of thought. \( B \) in following \( A \) must be, we grant, in some portion continuous with the latter; but from this it by no means follows that \( B \) succeeds \( A \) of necessity. A brick, when thrown at an object ten yards away from where it lay must pass through a continuous space of ten yards; but who would, therefore, assert that the continuity of movement explains the fact of movement and its direction? So with the flow of thought, which is only fully explained by the gradually developed process of the satisfaction of needs or functional readjustment. Omit the existence of needs, and no thought would ever be followed by another; what is more, every thought is but the expression of a need or of functional readjustment.

Reasoning along Brown's lines, one might plausibly contend that what we have called desires may be regarded as a sufficient explanation of the flow of thought. Thus the feeling of hunger may be said to explain the whole process which ends in stilling the hunger. Great as is the temptation to adopt this method of explanation, we find that the data are unfavourable to such an attempt. Owing to the nature of organised reactions, the desires have no qualitative and quantitative characteristics which can be employed as safe guides. They also give us no hint as to why they should be followed by certain particular ideational processes. On the other hand, in the bodily organism as evolved by natural selection, we have a complex system where, in theory as yet, it is true, we may follow the rise, development and satisfaction of needs to the minutest detail. We can understand, for instance, how a certain state of the stomach produces a series of changes which end in another state of that stomach.

Most generally stated, we may, therefore, say that what is to follow in thought must be continuous at some point with some parts of that which precedes it, while the fact of its following is solely the result of the existence of a need which presses for satisfaction.*

90a. — Associationism.

It is advisable to give here a summary of the associationist doctrine, supplementary to the remarks made in the Introduction. We have seen that Hume had already spoken of the laws of association as ultimate facts, and we have learnt that Hamilton held the same view. If then we pass to the other associationists, such as Brown, the two Mills, Bain, Spencer and Sully, we find the same belief in the finiteness of the process of association. In fact, this finiteness, within limits, is accepted by almost all psychologists of every school. Nevertheless, one drawback to complete intellectual satisfaction has been universally

* Stout draws fundamental distinctions to which, as our text shows, we cannot agree. In his Psychology, 1896, i, p. 123, he says that a man "never regards the suggestion of one idea by another as his own act. So far as the sequence of presentations is determined by association, it is determined for him and not by him." Robertson, again, says: "There is one kind of experience that is governed by association entirely, and that is the trains of bare representation termed Reverie." (Psychology, 1896, p. 104).
admitted. Why, it is asked, are there three laws of association? Why can they not be reduced to one? Accordingly an attempt at simplification has been made. Brown (Lectures, 1824, ii, p. 205) holds that "all suggestion and, may... be found to depend on prior co-existence, or at least on such immediate proximity as is itself, very probably, a modification of co-existence." Beneke (Lehrbuch, 1845, p. 88) says: "Similarity is analysable into sameness and difference, the difference being given simultaneously with the sameness." Similarly Hamilton, Hodgson and Bradley, in the passages referred to in the Introduction. So Lipps (Grundlagen, 1883, ch. 6), following his master Beneke, reduces contrast to similarity, similarity to contiguity and inseparable connection, and contiguity to simultaneity. A similar view is expressed by James (Psychology, 1890, i, p. 578). And lastly, according to Sully (Human Mind, 1892, i, p. 335), we assimilate in revival by similarity that portion which is common to both objects, the remaining part being re-produced by contiguity. In this manner the three laws of association may be said to have been reduced to one law, to immediate co-existence or, as some think, to immediate succession. Yet one step more remained to be taken. As Brown argued, and after him Bradley, if the association depends on the recognition of similarity or contiguity, then the object is already recalled when it is not yet associated. Hence Brown preferred the word suggestion, and reasoned that all one could say was that such a thing suggested such another thing. Rightly enough, therefore, Sully (Human Mind, i, p. 330) speaks of the association or suggestion of similars rather than of association or suggestion by similarity. This last stroke makes the hypothesis which are so recently unexceptionable as regards statement.

In strict theory we know now what to expect. If I see a face, it will suggest what has been associated with it along the lines of contiguity, resemblance and contrast. Thus the face suggested will suggest in its turn the totality of connected systems forwards and backwards, while, by implication, the face will suggest other faces, its colour other colours, its beauty the whole question of aesthetics, its expression the whole department of ethics, and so on. This is usually admitted, as the laws formulated by Bain show (sec. 1). Nor does Bain stand by himself. Already Brown (Lectures, 1824, ii, p. 357) had quoted, after Lord Kames, a long speech of the Hostess in Henry IV, to make clear that uncultured minds tend to re-produce things in tedious fulness, as illustrating the law of contiguity. For similar purposes James (Psychology, 1890, i, p. 571) quotes a similar type of speech from one of Miss Austen's works to illustrate what he calls the law of impartial reintegration. Thus Spencer (Psychology, 1890, i, p. 461) seems to associate himself with those who believe in the tendency for contiguous reinstatement. Sully, again, puts the matter unambiguously: "The sight of a familiar room, or the sound of a familiar name, tends to call up a number of images" (Human Mind, 1892, i, p. 339). So Stout, Manual, 1899: "If B has been perceived or thought of together with A or immediately after A, then, on a future occasion, the perception or idea of A will tend to call up the idea of B" (p. 420). And, "in proportion as the control of a dominant interest is weak and intermittent, the tendency is exactly to repeat the original order, without omissions and inclusive of interruptions" (ibid, p. 423). Or, again, "In any given stage of a train of thought the next step is partly determined by the controlling influence of the central idea of the topic with which the whole series is concerned, and partly by the special idea which has last emerged. In so far as it is determined by the latter, the principle of association is operative; in so far as it is determined by the central idea... noetic synthesis is operative... It is mere association, for instance, which would lead a man in a conversation on peace and war to begin to talk about Peace the murderer" (Psychology, 1890, ii, p. 3). So Lotze, Murocosmus, 1885, i, p. 216: "All reproduction rests on the impossibility of the resuscitated impression appearing alone, without trying to bring with it the whole of which it previously formed a part, and of that whole specially the other single part to which it was most closely attached." Similarly, Taine, L'Intelligence, 1874, p. 88: "When the image of the form we have perceived tends to revive, it draws with it the images of its several accompaniments." And so Stirner, Das Bewusstsein, 1879, p. 41: "As I am thinking of the word 'horse' so the many pictures
of the horses which I have seen, tend to appear." Thus the presumption of full rein-statements is not only admitted, but explicitly exemplified. As regards the illustrations given by the authors quoted, they are, for many reasons, of little value. In the first place, very few uncultured persons tend to obey the law of impartial reintegration; secondly, in all the examples given there is over-elaboration, but otherwise strict consistency or "noetic synthesis"; and, thirdly, the kind of impartiality demanded by the theory, is utterly absent even from the mind of the maddest of madmen. What usually happens is that the overwhelming majority of the details are forgotten; that the overwhelming majority of the remaining details are neglected; and that the overwhelming majority of similarities remain unnoticed. Sully, indeed, tells us that since the numerous suggested images "cannot be all revived together, there results a conflict of suggestive tendencies" (Human Mind, 1802, i, p. 339); but research offers us no such spectacle. Thus the letter a instead of suggesting to us the totality of our knowledge, may fail to suggest anything. [Experiment.] It is rather with cultured and with uncultured, with child and with man, as Stout (Manual, 1898, p. 42) puts it: "In recalling a train of events we usually pass from one salient occurrence to another, leaving out the relatively unimportant details which actually intervened between them." Or to quote an ideal case, most true to average life: "The ploughman's active day, is partly summed up in the furrowed field that is pictured in his mind in his evening retrospect" (Bain, Senses and Intelect, 1894, p. 476). This last example, by its utter unlikeness to what the theory demands, finally disposes of the simple solution of succession with which the laws of association were supposed to equip us. What is more, as the suspected tendency never, under any circumstances, is observable in fact, we have good reason to question its existence. It is true that what comes up in idea is, in some way, usually related by contiguity or similarity to what had preceded it; but the fact that such similars are not mere similars, but relevant ones, still leaves Paulhan's interpretation open that "it is not resemblance, it is convention which is the directing cause, the why of the association" (I. Activité Mentale, 1889, p. 408).

The glaring discrepancy between data and theory did not, of course, escape detection, and a number of secondary laws of suggestion were formulated by Brown (Lectures, 1824, ii, pp. 253-65), who urged that some units or ideas were at a greater disadvantage than others. These are his secondary principles: Continuity, or the length of time that an idea has been present at a stretch; liveliness, or the forcible impression which an idea has made upon us; frequency; recency, or the shortness of time which has elapsed since the idea was last in the fore; purity, or the clearness due to an idea having co-existed less with other feelings; constitution, or original constitution; temporary emotion, or the mood we are in; bodily state; and prior habits. Similarly Hodgson (Metaphysics, 1898, iii, p. 113) says: "Strength of original impression, number of connections with other impressions, and the increase by habit either of a particular impression or of any of its connections with others, seem thus to be the chief circumstances favourable to the readintegration of any given idea or imagery, under the two main laws of similarity and continuity of brain processes." So, to illustrate the influence of emotions which are common to many events, Brown says: "When, for example, the whiteness of untrampled snow brings to our mind the innocence of an unpolluted heart,—or a fine morning of spring the cheerful freshness of youth,—they may do this only by the influence of a common emotion excited by them" (Lectures, 1824, ii, p. 317). That Brown's secondary laws are all deduced from life, and play an important part there, no one will dispute; for a dull and uninteresting impression soon fades. We have still left the principle that what is remembered is contiguous to that which preceded it; but we have eliminated certain unfavoured similars. The chief thing we have gained is the recognition of emotion as a middleman between images, a recognition strangely under-rated by modern associationists, who casually refer to emotion as if they meant to ostracise it. Yet grant all the aids to association, and have we, then established the associating principle? I think not. If these aids were what they purport to be, thought would still be as wasteful as the roar of the sea, and dash aimlessly either and thither like the ocean.
waves. Thought would be in the condition of a goodly boat having fair sails but no propelling winds. If thought had to obey these secondary laws, instead of judiciously making use of them, we should die in the midst of plenty; for not what is striking, but what is pertinent, interests us, though what is striking may be easier to recall. In other words, of the ideas which have previously co-existed in some form, only those are ordinarily re-produced which are to the purpose, and those which are not, are as if they had never been in spite of liveliness, frequency, etc. Hence if the usefulness of things is in question, things useful are alone re-membered—liveliness, etc., helping here, though other aspects remain in the background. Every image re-incarnated in this manner suggests nothing and tends to suggest nothing, but gives place to another image of the same quality, decided by the continuing interest. As Paulhan (L’Activité Mentale, 1889, p. 17) expresses it: "A psychic fact tends to associate and to revive those elements which are able to unite with it for a common purpose," and "the tendency to systematic and inhibitive association is a property of the psychic elements." Or as James (Psychology, 1890, i, p. 259) says: "In all our voluntary thinking there is some topic or subject about which all the members of the thought revolve." (See also the same work (i, p. 568) where James allows for the influence of emotional interest.) Or as Stout enlarges upon it in his "noetic synthesis.

Since the text has shown that all association is development of a process in those directions which lead to the satisfaction of a need, we are ready to agree that the need can only walk those highways and byways, selecting its directions, which it has walked before: unsuitable developments will be stopped, while suitable developments will be followed up. Our point of view, therefore, approaches very closely to the associationist standpoint if emotional interest be allowed its full due, and if that interest be interpreted as a need seeking to satisfy itself. Previous co-existence in some form, ignoring here recency, would still be a condition of re-instatement, yet only a negative one: no co-existence = no re-instatement; co-existence = re-instatement, if desirable. One thing would not suggest another like thing; it would develop out of the former, because a need was passing that way. Hence association or suggestion would be a secondary principle, fully explained by the pressure of needs. Interpreted in this manner, by saying that association is topical, we have at once determined more clearly the process of the satisfaction of needs and the so-called final laws of associator; and indeed, by speaking of topical association or need-determined association we express in a simple fashion this double truth. The law of association might then read thus: actions, sensations, and states of feeling, occurring together or in close succession, in part or as a whole, are related in such a way that, when any one of them, or part of them, is afterwards developed in the mind, only those others, in part, or as a whole, can develop, such development being need-determined. Stated in some such language the association theory still retains its essential feature, i.e., the fact of close relationship between ideational antecedent and consequent. It is possible that even observation falls under this revised form of Bain's statement.

Above all things it is necessary not only to admit changes in theory, but to give them their proper position. Bain, for instance, while admitting the peculiar effects of recency and emotional interest, effects which are most vital to all thought, allots them a few pages, and fills hundreds of pages with an unnecessary exposition of the nature of contiguity and similarity. In the same spirit he says that "in all difficult operations for purposes or ends, the rule of trial and error is the grand and final resort" (Senses and Intelect, 1894, p. 609), and "the number of words that pass across the mind in forming a single couplet may be a hundred times those actually made use of" (ibid, p. 610), suggesting, what is the opposite of the facts, that a host of details is passed in review with the object of finding one that is not indifferent. James Mill supplies us with another striking example of the woodiness of associationist interpretations. He says "Our suggests father, father suggests which, which suggests art; and so on to the end." (Analysis, 1869, i, p. 80). In the same way, while he admits that "in the man who composes the coherent discourse, the main idea, that of the end in view, predominates, and controls the association, in every part of the process" (ibid, ii, p. 371), he yet explains that the main idea only
vetoes irrelevant developments, as if the main idea were not an idea capable of self-development like other ideas. In agreement with Mill, Sully argues that "the action of attention does not effect a reinstatement of an image independently of the forces of suggestion," but that it can "aid in the realisation of certain of these tendencies rather than of others" (Human Mind, 1892, i. p. 346), as if attention were anything outside the ideas or needs. Brown alone freely allows for the play of interest, and it seems difficult to understand why he has had no determined followers. At all events, the half-heartedness with which new facts have been welcomed by associationists, has largely assisted in depreciating their theory altogether.

If the process of association expressed a great truth chained to a great untruth, so much cannot be said for the way associationists conceived the individual ideas. As this subject is treated elsewhere (sec. 107), we need not enter into detail. Only this much may be said, that association ideas have a logical completeness which is essentially absent in the product as we know it. The five-sense features were supposed to be ever present, while the many other sense elements, feelings and relations were neglected when they were not ignored. The feelings, too, were given a place which was far from expressing their natural position in the series of systems.

Certain cases of quasi-associations are best disposed of here. In re-instating a certain remark, there appears along with it the open book in which I read it, as well as the picture of the locality where I was at the time. Examining this accidental instance, I come to the conclusion that the remark, plus book, plus locality, were in the first instance, for no matter what reason, welded into one fact: remark-book-locality. In some occurrences, therefore, what seems the re-production of one idea by another is really a single image. So Sully, Human Mind, 1892, i. pp. 339-41; Paulhan, L'Activité Mentale, 1889, pp. 429-43; Ward, Psychology, 1866, p. 57, col. 2; Wundt, Psychologie, 1893, ii, pp. 437-53; and Stout, Manual, 1898, p. 94. A different explanation applies in a set of related groups of systems. We are, for instance, interested in the locality spoken of, and we cannot resist the temptation of going off at a tangent for a moment as we re-collect the remark. Here re-collection is topical and indirectly developed, though the seeming co-existence of two points suggests associative re-integration. Disallow the purpose, so distraction—thinking in bits—becomes an important factor. Again, one particular object has so often been re-collected after another that when the necessity for sequent re-production has gone, we yet bring back the second through forgetfulness of the particular chief need of the moment. To put it paradoxically, we will that which we do not will; or, to be more precise, the lesser needs, as Paulhan urges, are acting independently. Again, two things have been continually thought of together, and if they are sufficiently close to one another, they are gradually embraced in a single act of attention, fusing and thus becoming one. In such an instance we have a twin object before us, and not one object re-producing another. The same would hold when we re-collect an object as moving. Lastly, since every object is psychologically a complex, and since, for instance, the re-collection of a man’s eyes require usually the re-collection of his face, it follows that all objects observed or imagined, contain many features more or less inseparably united. This process is named by Sully, among others, assimilation (Human Mind, 1892, i. pp. 178-84), and intuitions form a good illustration of it. Binet, having the same facts in mind, speaks of the law of fusion (Le Raisonnement, 1886, pp. 96 ff.).

These elements are like the flour and the water which the baker kneads together in a dough: their bare presence does nothing towards their entering into a union; a need accomplishes that. Our brains resemble a civilised country with high-roads, by-roads, field-paths, rivers, canals and railways, as well as arable land and pasture land, mountains and hollows, towns and villages, and authorities. In this orderly land, the needs form the population. Abolish, however, all useful institutions in a country, and you cripple the individual; and so the absence of pioneering profoundly affects the manner in which needs are satisfied.

Additional References on, Association.—Aschaffenburg, Experimentelle Studien über
91. Ideational Complications.

We are now possessed of the static and dynamic elements of thought; but that is still far from saying that our analysis is complete. If thoughts were like dust grains which the willful winds whip hither and thither, now into this nook and again into that open plain, little else need be added. As the matter stands, however, thought reflects the complex organism and shapes itself into a unity, its cells developing into a variety of connected tissues. On this account we must continue our dissection of ideational compounds, though we have concluded our examination of ideational elements.

92. Thought represents the Satisfaction of Needs.

The simplest case we can select for study, is a bare amplification of what we have analysed above. Suppose we say that the Sophists stimulated the thought of Socrates; Socrates stimulated the thought of Plato; Plato stimulated the thought of Aristotle; and Aristotle stimulated the thought of the succeeding centuries. In this instance, leaving aside niceties, the development of thought is consecutive or telescopic, i.e., A develops into B, B into C, C into D, and D into E. In rambling thought, speaking generally, this A-B, B-C method is common; and poor disputants scarcely launch a subject, before they leave it for another one suggested by a portion of the argument. Yet where thought is so focused a series of events chronologically, this mode of procedure is in place. However, thought is more often a centre where each unit is connected not with its predecessor, but with the centre alone. For instance, we may say
that "X. wasted his time, his opportunities, his fortune and his health before marriage. When he was married he neglected his wife, his children and himself. His influence on his family, like his influence generally on those who came into contact with him, was pernicious. No one was ever heard to say a good word for him." Here is a centre around which a regiment of systems is quartered. We wish to express what evil we know of a man, and in centrally determined sequence were-collect what is pertinent. The points do not suggest anything or each other, nor are they related one to the other; but they radiate directly from one idea. When we ask: What defence can you offer of your conduct, of your enterprise or of your philosophy, then the terms "conduct," "enterprise" and "philosophy," are the magnets around which groups of systems arrange themselves. Nor is this class of thought occasional or unimportant. If we reflect that broad-based needs ever seek to be satisfied, and that nothing otherwise interests us, we must conclude that thought is pre-eminently centralised, and it is thus that a need arises and initiates such processes as lead to its satisfaction. Moreover, even where the order is chronological, the need for such order alone secures the stream of thought, and, therefore, a central unit is always in command. Hence units are not followed in endless succession by other units; but every train is arrested or developed, as the controlling need may determine.

If thought, as such, is need-determined, we shall have to beware of adopting the ordinary mechanical notions as regards ideation. A man may imagine that once an image is developed, the host of others linked with it, tend also to develop. So, too, it may plausibly be urged that the more striking and oft-repeated ideas will specially press, or tend to press, towards the front. On the other hand, on theoretical grounds, we have to discount these suggestions. As thought is need-determined, i.e., determined by functional readjustment, and as the nature of economisation excludes what is superfluous, we should expect that, normally speaking, no more is developed than is to the point. Thus the most significant aspects will not as a rule be even suspected when the least significant ones are being sought. [Test.] Accordingly, only what is relevant will normally tend to appear, since any other method of procedure would be stupidly wasteful, and, therefore, checked by natural selection. Needless to say, introspective experiment seems to bear out this contention.

See the chapter on Relative Suggestion in Stout's Analytic Psychology, 1896; see also Wundt, Psychologie, 1893, ii, p. 476, where he defines apperception as a "function causally determined by the whole development of a consciousness," a definition which scarcely describes the elastic processes enlarged upon in this work.

93.—Some Results of Economisation.

The results of economisation must now be faced once more, and with them the nature of secondary complications. In the crude history which we have supplied of the bad man X, several points require elucidation.
tion. In a more primitive condition than that of the average adult, perhaps only the one notion of X. being bad could be entertained, while the moment another idea developed the first one would be swept away. This is not so with the average human being. Having settled that X. is a bad man, we may investigate his state without for a moment forgetting what we think of him. If we turn inward, it would be preposterous to say that, like the famous writing on the wall, the words "X. is a bad man" persist. Economisation has reduced this awareness to a trace, an area being kept sensitised, in contact and ready to react. When, therefore, I go into the next room to fetch a book, my thoughts, in walking, are far from it. Yet there is still a residue ready to react, and when that is gone, the errand is forgotten. [Experiment.] What is true of the central thought, is true of the whole process as expressed in the words which I employed. Every subsidiary unit remains semi-nascent, in agreement with the fact of recency, thus securing a coherent and progressive process. The units are simplified to the utmost. They do not dwell in some sub-consciousness, and they find no substitutes; only that little is re-membered which is essential.

94.—The Language of the Adult.

It is when we come to the word-sentence, that the nature of secondary and simplified complications is most striking. Indeed, so large a part do they play therein that it becomes difficult not to exaggerate. Generally stated one may affirm that the sentences which an adult uses are secondary complications, slightly modified according to familiar methods. We have, so to speak, said everything we have to say previously, since the situations we meet with vary but microscopically. Given an act and it is generally a repetition of some act; and given the need for utterance, and the sentence employed on a previous occasion will be employed once more. We have not, at any time, the whole vocabulary in view, from which we select a dozen words; these dozen words are practically given as a sentence by memory. When a state is more pronounced, we put in some term like "very"; and when "Brown" is meant and not "White," the names are changed. The sentences are constructed on exceedingly well known models; and what adaptations are needed, are quickly found because we are well acquainted with them. Whenever familiarity is absent, we struggle painfully before we can properly express ourselves. Thus only he who has studied resolutions or documents can draw them up with ease or draw them up at all; and thus the educated man talks well, because he is a dealer in secondary complications. Only an infinitesimal portion of a man's phrases shows to any extent the bloom of freshness. Illustrations of the more intimate speech processes are near at hand. In learning a new alphabet, some time elapses before we can readily write any letter we wish. Yet, if at this latter stage we try to write a word in this alphabet, we find that the letters cannot be re-developed in a flash, as is required. Only prolonged exercise allows us to write,
read or speak with expedition. Should a difficulty occur, as it occurs in nearly every sentence which is at all modified, the time spent, as can be observed, is masked by the easy steps making up for the more difficult ones, i.e., thought is active prospectively while the words are being uttered. [Experiment.] By this means groups of systems are ever readjusting themselves with but slight confusion. Ordinarily, then, we deal in word-sentences which have but a spark of immediate or direct meaning, an unusual context alone acting as a challenge. We see, therefore, that an atomic conception of the ideational process—as where self-satisfied ideas are said to suggest contiguous or similar ideas,—leaves us completely in the dark as to its drift, while, at the same time, we come to lose faith in the reasoning faculty as ordinarily interpreted. (Sec. 215.)

The thought currency has no standard value. Our depth of insight, our justness of perception, our delicacy of definition, vary incalculably. There is little we read of even light literature which does not grow in intelligibility by careful re-reading, and we constantly discover in this way that we have overlooked a great deal and misinterpreted much. Hence the almost endless differences in intellect. The poet who describes the impression made upon him by the strain of some wild bird, is hardly ever satisfied with his word-painting. When the lines reach his readers, the colouring is interpreted most variously: some who are lovers and students of nature follow pretty closely; others understand fairly well; most have a shadowy suggestion of delight; and not a few miss the meaning entirely. The thought currency is not turned out by machines—carefully weighed, and each coin bearing an intimate resemblance to every other. Its counters, on the whole, do their duty; but that is all. They are subject to rapid wear and tear, appreciation and depreciation. A farthing now becomes a sovereign; and again the touch of some one else makes it counterfeit. Because two men read a passage with equal fluency, and apparently with equal intelligence, it by no means follows that the understanding of each is a copy of that of the other. Approximation, it is true, is ordinarily attained; but the finer grades, on which the value of a contribution depends, are perhaps overlooked by one or by both. Only a diligent and long-continued education provides men with a comparatively precise understanding of what they meet with. We have, therefore, to fight our way to the forefront of knowledge, and there is not a road over which we march but we have to be alert. Once assimilation, through organised reaction, has proceeded far, we are able to comprehend all that is below us. Ideas must be known, as a whole, to be easily grasped. Hence the need for a preliminary process of study, while sustained repetition is required to overcome the gnawing propensities of oblivion.

95.—We are not restricted to one unit or idea at a time.

A pregnant proposition of a new order has struggled to the fore in the last section; it is that we are not limited to one unit at a time (sec. 38). Hence, in carefully testing a proposition or a statement, we find that there are perhaps dozens of brain centres sensitive, a condition which the fact of recency makes readily intelligible. Yet we know that a complex argument, like many a German sentence, may be too much for us; though there is no problem, however complex, which is not conceivably easy to some possible intelligence, while it will be granted that the lower animals would find almost the plainest human problem intolerably hard.

Educated thought requires that we should have in view a multiplicity of
details, and that we should be on the alert for many possible contingencies. What is more, we can deal with more than one subject at a time. At first the growing school boy may have to stop his walk if he wishes to practise what is to him the new art of whistling; but he soon learns to do both things at the same time. So also in learning to play the piano, we can only conquer by dividing the task. It is, therefore, purely a practical question how many centres of thought or activity may be busy at a time. We can do thus much and no more; and within such limits, a number of subjects are possible. Engaged with both eyes and one hand, I trifle with the other hand, while re-producing some complex occurrence utterly foreign to the work and to the trifling. According as the work or the re-produced occurrence draws more heavily on the fund of attention, so one or the other receives less attention. The quantity of subjects we can entertain is, therefore, not limited, except that with human beings any considerable difficulty absorbs nearly all the available attention. A race with a brain of a higher type could perhaps follow twenty or more serious subjects at once. [Test this section.]

96.—GENERAL METHODS IN THOUGHT.

I asked myself whether I had ever before seen a certain face, and in a moment that face was re-produced. We wish at this stage to know if the connection between question and answer was direct or indirect. On closer inquiry the latter proves to be the fact. Times out of number I had put similar questions, and the demand hence became connected with the active tendency to recall along lines of similarity, identity, recency, etc. We are, therefore, dealing with a secondary complication. The question relates to an attempt to re-develop what is relevant, and thus the secondary process, instead of rushing to a conclusion or acting on its own initiative, reaches it in predetermined zigzag fashion. There is, of course, no need to imagine the active tendency to be elaborate, or connected with a sentence of so many words, since economisation is certain to curtail these luxuries. All that probably happens is that a brain area is readily sensitised, because it has been sensitised formerly. The very swiftness and matter-of-factness of the process is only what we should expect. We have an image, a connected active tendency and a resulting process.

What is true of the above problem, is true generally. I may, for instance, be puzzled because there lies on the table a certain book which I do not remember to have taken from the shelves. [Experiment.] Suddenly I recollect that I have fetched the wrong volume. It is only apparently that the relevant answer stands in direct relation with the attitude of distraction. The fact is that the attitude of being puzzled is secondarily connected with the attitude of trying to re-develop what is pertinent to the issue, i.e., what will explain the unexpected occurrence. We have here to do with a class of thought indirectly and not directly related.

Secondary complications are naturally formed in conjunction with every line of activity which is at all common, and such lines constitute the
streets and lanes of thought. Accordingly, *whatever is important, striking, interesting, out of place, strange, obscure, useful, doubtful, subtle, pleasant, beautiful, witty,* etc., etc.—all these representing needs or stimulating them—*builds secondary complications of its own by which the trend of thought is in later life developed along well worn but unnoticed grooves.* Let us consider an example, the only complete one which my notebook offers. Some one says to me, jestingly, that my income amounts to £x 15s. per day, a figure which is considerably higher than the correct one. By a method of further exaggeration, secondary in character, I rejoined that the true sum is £x 19s. 11½d., the figures developing while I am uttering them. I was saying £x 19s., and, seeking all the time organically for further exaggeration, I added 11d. Striving to exaggerate still further, I affixed another ¾d. *While each step was taken for secondary reasons, the content of every step was similarly decided,* the sum 11½d., for instance, being a figure frequently quoted. Should something not quite relevant appear, it is silently suppressed, and our search is continued along known routes. *Thus the general tendency as well as its expression is habitual.* [Experiment.]

Stout, in opposition to the above, argues that "of course each single pun requires attention; but the general trend of attention in this direction, rather than in other directions is a matter of habit" (Mumma, 1898, p. 101). I have endeavored to show that the distinction is not easily sustained.

Again, consider the process by which I solve an intellectual problem. The problem presents itself. With its presentation is connected the recollection of what most favours my theory; with that an attempt to find material which tends to contradict that; with that, that which negates it; with that, what proves it to be but partially true; with that, what shows that the argument proves too much; and so on. The progress of thought is, of course, not so easy of prediction as here suggested, since every class of thought is connected generally with several others rather than with one. But usually different individuals display different well marked secondary complications which oscillate only within trifling degrees. The inconsequence, the stupidity or the geniality of an intelligence is ever determined by the class of secondary complications which have developed.

Take another illustration. I hastily read over a shop the words "Moral Decorations." "What," I mutter, "Moral Decorations?" it must be "Floral Decorations." Now I might have recognized my mistake by a chance glance in the direction of the word, and there it might have ended; or I might have warned myself against mis-reading this particular word over this shop, in which case the warning would have formed a complication with that particular word in that particular place, and hence on re-reading, the warning would automatically develop, *since we always try for connected thoughts when we are not absorbed.* The warning might,
again, have been attached to the re-reading of those words generally, or to reading-matter as a whole or to life generally. Perhaps with the notion of the mistake has been combined the notion of preventing the recurrence of such blunders. In that case, the recognition of my mistake in this particular instance would develop into the warning not to permit the occurrence of similar mistakes. Such general rules, embodied in secondary complications, are common; they constitute a man's intellectual character.

The quality of the secondary complications is of supreme importance in practice. Shallow persons employ shallow rules, while wise men are guided by maxims of deep import. Accordingly, for the seeker after truths, such rules as “observe closely,” “test the statement repeatedly,” “show that the contention is partly true, that the contrary holds, that it proves too much or too little,” are bracing; and so with the rule always to generalise daringly yet guardedly, in an order which gradually extends in every direction from what is most related to what is least related. It is methods such as these that make intellectual progress possible, rather than the syllogism which is cumbersome and presupposes them, or Mill’s Canons of Induction which are dangerous without them. (Secs. 65a and 136.)

No one who is not both cynical and perverse, would demand a moral justification of mathematics, since innumerable and sweeping truths have been deduced by their means. Their simple axioms have been indisputably useful. Not so with Logic. While boasting of certainty and infallibility, it has no fruits to show, only leaves bound up in ponderous tomes. In mathematics the simple law of identity is elaborated into a vast but graded system. In Logic we begin and end with certain so-called ultimate truths. While, again, mathematics have been actively applied in science, logic has remained in the hands of “philosophers,” its rules being ignored by practical men. At the same time, the attacks on the syllogism have not abated since Locke gave the signal. To me it appears that a false psychology must mean a false logic, and that the barrenness of the methods of logic are the direct result of its disputatious basis. What would ever think in syllogisms? Those who, like Archbishop Whately (Logic, 1844, Appendix III.) apply them to obtain new truths, fail deplorably, and naturally the man who helps in doing the world’s work, smiles when any one proposes to him what no one calls into question. The shortcomings of the syllogistic method are evident. To begin with, the truths obtainable in ordinary life are derived from the judgment and not from demonstration. We are sure of very little, and we make sure of less because of the difficulties in the way. This indeterminate-ness alone would prove fatal to the use of the syllogism. However, its defects lie deeper.

Let us choose a syllogism for illustration.

All towns with a high-rate of mortality have a bad system of drainage;
Blank town has a high rate of mortality;
Therefore, Blank town has a bad system of drainage.

Now many a person will agree with the reasoning of this syllogism, and yet, in a strict sense, our syllogism, by its straight form, has probably strengthened error. To begin with, the plausible major premise is incorrect, for the cause of a town’s mortality rate is not to be settled in so off-hand a manner; and when we come to the minor premise it is quite likely that the mortality figures are haggard or unreliable, and that the mortality is the reverse of that suggested. Hence we obtain a flawless conclusion of no value. Indeed, if we had ascertained that the facts were as we had stated them to be, a formal syllogism would be a pure luxury. What we need is a scientific catechism which shall allow for probability and which shall suggest methods of finding truths. We ought to be ready to ask as to the major premise, on what is the statement based? Does it contain official expert reports stretching over many countries and years, and are there no exceptions?
What are the verified reasons for this strict relationship? If, after that, the answer comes that it is reasonable to connect the two, we must say that the conclusion may be regarded as fair, but not as proven, and that the facts may even bear evidence to the contrary. So also must we proceed with the minor premise, and judiciously examine the statement by a number of queries as to its precise basis, and whether there is not a flaw somewhere. A catechism of such a nature might put even the splendid results of mathematics to shame, stimulating and guiding inquiry in the humblest as in the highest departments of life.

Ordinary reasoners well illustrate the absence as well as the need of method. They readily assume that, say, the relation of the figures prove Board Schools to have reduced the number of criminals; they forget to question the correctness of the figures; and they do not ask whether legal or social influences have produced any changes. To this must be added the general presence of strong bias which accentuates the error. Hence only a deliberately elaborated system of education which takes account of these weaknesses and makes them impossible, will prove of service against the tendencies generally prevailing, especially where matters of "opinion" are concerned. (For criticisms on the syllogism, see Mill, Logic, 1875, bk. 2, chs. 2 and 3; Locke, Human Understanding, bk. 4, ch. 17, secs. 4-8; Sigwart, Logic, 1805, trs., pp. 359-62; Spencer, Psychology, 1890, ii, pp. 6-116; Lachelier, Théorie du Syllogisme, 1875; and Jevons, Principles of Science, 1877, who holds a modified theory which almost equally deserves the reproach of being mechanical and unsatisfactory for the advancement of learning.)

Mill's canons of induction (Lo, 1875, bk. 3, ch. 8) help us somewhat along the road; but they are still critical rather than constructive. Suppose I wish to shorten a string, how am I to do it by Mill's method? If the canons are of no assistance to me in that, they fail in what is the normal business of thought, i.e., to meet contingencies. The moment my inquiry suggests a solution, the canons become of some value; but even here, how am I to apply the principles of agreement, difference, concomitant variation or residue? How am I to judge instances where the truths to be obtained are imperfect ones? Without, therefore, ignoring the canons, we must persist in our contention that their object, like that of the syllogism, is final criticism rather than the active discovery of truth.

I wish to solve the problem of the relation between crime and Board Schools, and consult Mill's canons. Now if, apart from Mill, I do not know how to proceed, I shall never make a beginning. Suppose I do proceed, how am I to sift the figures? I ask my informant, "Are you quite sure about your facts?" What if he answers "Yes; I am quite sure"? In that case, the solution of the problem, if it depended on the canons, would remain in a mournful condition. I may think that I have arranged every detail, when I have but dreamily skimmed the surface, or I fancy that I am triumphantly applying the rules, when, in fact, I am wasting my time. A stray hint thus appears a complete induction. Mill's chapters on the moral sciences are, in this manner, built up in a somewhat fanciful fashion, statements which are not even half truths being paraded as thoroughbred inductions. His canons, therefore, we conclude, presuppose that we are carefully trained observers; that we have garnered a large stock of useful information; that we are disciplined in recognising hidden resemblances and differences; that we are inventive, methodical, and the like. In other words, his laws, valuable in their way, form but a trifling portion of a true scientific canon.

The nature of a general unit or idea must now be fairly clear. We read the words "Moral Decorations." That being a not previously known complex, it necessarily appears strange. With the fact of strangeness has been systematically combined the process of doubt and re-examination, and hence in every case of strangeness the thorough student doubts and re-examines. [Examine cases of strangeness.] Similarly we may resolve that, subject to tests, whatever seems useful should be applied not only once,
but always; not only in the given direction, but also in related ones. When, accordingly, I chance to recognise that deliberateness of speech has been useful on a certain occasion, that recognition develops into the tentative recognition that deliberateness of speech, action and thought is always desirable for every one. We must not, however, strain the significance of language. The recognised slowness in deliberation, in connection with its effectiveness, may of itself impress us, so that we dwell on both aim and slowness with the result that the re-collection of an aim suggests the slowness. Hence when a new notion occurs to me, that fact alone sets me generalising without the interference of language and without reference to the fact. Generally speaking, economisation will eliminate complex imagery and language. [Observe such instances.]

It seems somewhat strained to assume that the process of orderly development which I have sketched, quite accounts for the somewhat erratic course of thought. One wonders whether old ideas or those which are interesting have not some secret manner of entrance. The suspicion is legitimate; but a satisfactory answer is forthcoming. The organised notion of exploring out-of-the-way ideas and combinations of ideas is persistent, and results in keeping us in touch with much that would otherwise be wholly forgotten. So also such phrases as “old times, boyhood,” etc., are organically attended to with fruitful consequences. Thus again the very pause in thought when it occurs, the very lack of action, is often organically connected with particular interests and lines of memories, and these latter are hence easily developed. In this manner I re-member connecting without deliberation the word “psychology” with any pause, thus ensuring persistent recurrence to the topic. It is in this fashion, by a multitude of organised arrangements, that breadth of thought and continuity of interest are maintained. We see here again that the flow of thought, as we know it in any case, is not determined by the particles forming the stream; and that for nought we can conjecture in any instance the flow may stop at any moment. Continuity of thought is due to the presence of highly developed needs, and if these needs are to be explained in terms of the secondary series, then it will be states of feeling and not states of imagery, as is popularly held, which will form the connecting link or force.

97.—Knowledge is mostly a Social Product.

Human beings are part and parcel of a natural and social order to which on pain of punishment they are bound to conform. Hence their reactions will be of a type which is both need-determined and secondarily social, and hence a huge accumulation of somewhat loosely connected secondary complications will be evolved which characterise man and men. If the individual possessed great natural sagacity he would quickly manufacture rational secondary complications. As it is, the contrary is true. The individual laboriously makes his own what mankind has already laboriously elaborated. Where he is much left to his own devices, the complications are of the crudest and most unsatisfactory type, the interconnecting or reasoning being reckless, sporadic and devoid of far-reaching relations. This doctrine of the slow growth and the social nature of secondary complications will solve many questions in animal psychology. For example, a human being is shut in a room, which he leaves, when he wishes, by opening the door. A cat, on the contrary, can only open the
door, we are told, by a chance hit in her frantic endeavour to escape. When again shut in, she does not at once re-member the way; she is only a little quicker in escaping. [Observe, if possible, such cases.] Hence the power of interconnecting or reasoning is by many denied to the cat. However, if our contentions are justifiable, it will be seen that the adult human being has an education and a practice which the neglected cat entirely lacks, and that the educated cat would be far superior to the untrained man. The educated man is not a man full of invention; he is one who has the capacity for learning, and has stored up methods of answering all sorts of questions. Fundamentally, the chance hit and the inferred method of opening the door are on the same level. Both are equally automatic, or rather organic. (Sec. 233.)

98.—The Origin of Needs and Their Classification.

The human organism may be regarded as developed by natural selection to produce ova, and to protect them while they are in need of protection (Foster, Physiology, part 4, 1891, p. 1555). With the latter task fulfilled, man's mission is at an end, and he turns into food for worms. This mechanism which we are, has a quantity of explosive properties. "The eye craves to see, the ear to hear, the hands to touch, grasp and handle" (Rümelin, Über das Wesen der Gewohnheit, 1881, p. 155), the stomach to digest, and the brain to settle differences between the other systems which constitute the organism, and also between the last and its environment. That which produces the unstable condition at any time—chemical, mechanical, electrical, or what not—we may speak of as a need. Needs, then, are the forces which set us and keep us going, and they may be classified as follows: (1) Permanent Needs, which embrace such activities as breathing and eating; (2) Periodic Needs, which comprehend the tendencies that distinguish the seven ages of man, such as infancy, play, school, courtship, adventure, staidness, second childhood; (3) Personal Needs, such as are implied in the original constitution of individual men; (4) Peculiar Needs, which are connected with the special surroundings of the individual; (5) Political Needs, which are traceable to our physical, historical and general social environment, and (6) Passing Needs, which come and go and are, therefore, of little importance. [Add, if possible, to these needs.]

In an ideal organism a pressing need would no sooner develop than it would be satisfied, complexity of process being absent. In the case of man, on the contrary, elaboration proceeds slowly and is cumbersome. Simple problems are solved easily enough; but the more difficult ones, which abound, occupy the brains of many generations. On this account thought is usually busied with some subject which it attacks from many directions. In other words, the majority of our individual notions group themselves round a few centres. We want, for instance, to find a suitable holiday resort. Stimulated by this need, we wander along countless ideational paths, always guided and guarded by the central thought. At one
point we re-produce several places; and at another, we re-produce what we know of these places. Perhaps we re-member what kind of a resort would suit us, or what resort has been recommended by friends. In this way half-an-hour is easily employed in meeting difficulties. [Test such cases.] Multitudes of thoughts, relating to the issue and differing in character, are requisitioned to solve one problem. Since needs, then, determine the order of thoughts, we may speak of thought as need-determined. Ideation will, therefore, possess only one rule, that of relevancy to a topic. Mere similarity or proximity will possess no value.

99.—A Complex Ideational Process Examined.

Let us examine a complex event—the best sample which, from a psychological point of view, my notebook offers. I wish to go into the country, and to stay there over night. This develops, in walking, into the notion that I must at once move in the matter. But what shall I write? I begin, "I shall, except if compelled to lecture." I weigh the words. "I shall, except if compelled to lecture;" "except if" sounds strange; replace it by "unless." "I shall, unless compelled to lecture, be with you to-morrow afternoon and stay over night." I must add "if convenient;" and, on further reflection, "if there is room for me." I am becoming confused, and I try to retain the central thought by repeating several times, half aloud and vigorously. "I shall." I am successful. "I shall, except if... unless... (make it shorter) I am lecturing, be with you... stay with you... to-morrow afternoon, and remain over night if you have... if there is room... room for me." This is an abbreviated statement of a certain subject of thought pursued under very trying circumstances. The not unusual determination to spend a day in the country was secondarily connected with the need for writing. That again was similarly combined with the needs for writing fully, clearly and suc- cinctly. These again were attached secondarily to the need for testing and recurring to every step. Again, the central need persisted throughout; and the sensitising of the area which was involved, probably meant the simultaneous sensitising of half-a-dozen secondarily connected areas. At the same time, effectiveness was produced by secondarily dwelling on each issuing thought. Thus in pursuing a subject, thoughts do not follow each other in prim single file procession; they tumble over each other like the waves returning from the sea shore.

99a.—Comparison.

In the portion of our problem which we are considering in the present section, I have had recourse more than once to comparison. In this aspect of intellect we have to study a new class of facts. When making a comparison, we observe at least two objects, and deliver a judgment implying that double observation. There are two objects simul-taneously present. What we learnt in the second chapter dispenses any possible contra-diction involved in realising at once more than one object. Attention, we saw, dealt with fields, not with points. We found no reason to assume that there was any necessary restriction as to the number of things attended to. Whatever the boundaries, they are incidental
to the particular species or individual. We learnt that we can attend, and persistently do
attend, to more than one object at a time (sec. 35). As comparison implies attending to
two things in a related manner, it raises thus far no new issue. The problem is somewhat
more complicated than those we have analysed, but otherwise offers no fresh difficulties.
The peculiar ability is, of course, normally guided by fixed dispositions. The machinery
of organised reaction moulds this portion of our intellect as it does every other. It is for
this reason that we must enter more minutely into the problem before us.

We have considered the simplest class of comparison, where all three aspects co-exist.
In steadily keeping in view the flame of a street lamp and its reflection on the pane of glass
which bounds it on the side opposite to us [analyse such a case], we encounter an ideally
simple instance; for the comparison of the relative brightness of the light and of its reflection
is made while viewing both simultaneously. In the final analysis this means that two
simultaneously proceeding processes end in a third which is their resultant. Of course
the two images do not give birth to a third. They are only an inconsiderable fraction of
the relevant total state.

In comparing two notes struck in order of time by a tuning-fork, we meet an apparent
absence of simultaneity, in which particular this observation differs from the previous one.
[Test this.] The point is to ascertain how the comparison results now that the objects
are divided in time. Observation leads us to accept the following solution. Whatever
affects an individual, especially when he is interested, leaves behind it a marked summary
feeling which lasts for some little time (sec. 109). Though the auditory image has dis-
appeared, the feeling which accompanied it lingers on. This hovering spirit indicates
that the sensitised brain area is still sensitive. Were the affected locality to recover its
equilibrium at once, there would be no lingering feeling. When, then, the tuning fork strikes
the second note, there is still in existence a trace of the first. Hence the notes,
while objectively separated, neurally co-exist. We broach, therefore, no new problem in
the comparison of objects which succeed each other closely. It is true that they are not
before us; but as the accompanying feelings are, something still co-exists even in the secondary
realm. If one state be fainter than another, or vary in certain aspects from its neighbour,
then we interpret this divergence in uniformity with custom. If one relevant total
state were obliterated before a second total one succeeded, comparison would be inconceiv-
able; but if we assume co-existence, through continued neural sensitiveness, the obstacles
vanish. There is a clashing of forces with a consequent resultant force, the latter con-
stituting the comparison.

Again. Instead of comparing two successive notes immediately after hearing the
second, we can successively re-instate for comparison the two notes after a more or less
prolonged interval. [Test this.] We shall face to face here with no new issue. Having
re-integrated the two notes in succession, the process above described is repeated. The
feelings are not now so vivid, but relatively the differences have remained intact. Observa-
tion teaches us to discount the gradual waning of images and feelings. If one or other
were not re-developed properly we should find, when occasion offered, that our compar-
ison was objectively faulty.

In the example of comparing two successive notes, both were not simultaneously present.
In general memory, also, re-collection of sight images is most incomplete, and normally
comparison proceeds in their absence. Our analysis of organised reaction suggests that of
itself: the minimum is nearly always the maximum for the attention. Whatever can be
eliminated with advantage is generally dispensed with. Comparison is, therefore, never de-
pendent on a careful scrutiny of a present or a re-constituted object. Intuition is no
more vivid than needs prescribe. In satisfying itself a need is not bound to consider
complete objects: it deals with the residues which, for its purposes, are just as good.
Hence in thinking we are normally unaware of a swift succession of images. Not only
so, but close scrutiny reduces rather than increases the number of images which we imagine
to be hovering about. This harmonises with our expectations. A large amount of attention
and time would be wasted if we were not so. Topical reaction or reasoning, to judge
from time measurements, would be inordinately slow if complete imagery were an es-
sential, while our memory does not even enable us to re-develop past events minutely (sec. 114).

It follows that, through the agency of economisation, thought is reduced to a procedure resembling algebra; only that the signs here are natural ones. The principle which serves as our guide in neural elaboration is that a portion of the whole shall act for the whole. Thus when a certain thought feeling evolves, we do not wait till it has developed, for instance, into poetry, but we interpret it to mean that we re-member the poem (sec. 127). Only when the note which memory sounds is dubious, do we repeat the lines. Such feelings, as previously stated, do not differ indefinitely in quality and warmth one from the other. With varying occasions like feelings yield diverse results, time and what it brings with it being their interpreter. Intellection is, therefore, not a short-hand, but a shortened hand. We employ legions of abbreviations and we make use of a quantity of arbitrary signs. It is only occasionally, therefore, that we write a word in full, and it is unusual to put down a sentence in its barbaric completeness. A psychology which considers the normal current of thought to be a stream of connected words and sight images or a succession of self-centred atoms, entirely misapprehends ideational activities.

We assume too much when we appear to regard sign thought as the lowest stage. Much of our thinking delves deeper. In ordinary reasoning or interconnecting even well-marked feelings are comparatively rare, and yet while the feelings are often vague, the resulting comparison or notion is perhaps a model of clearness. In these by no means infrequent cases, feeling may be supposed to accompany, without indicating, brain activity the completion of which is signalled by the emergence of a conclusion.*

99b.—Semi-Connection or Doubt and Related States.

When we have once mastered the conclusions arrived at in the preceding paragraphs, a problem such as doubt or semi-connection is easily disposed of. Thought is, of course, topical—a nerve area rather than a single nerve trick being affected. When, therefore, I am in doubt, and I ask myself whether I had kept a particular promise, first Yes and then No issues as the answer, which latter reply, in see saw fashion, is again followed by a Yes, and so forth. [Examine instance of doubt.] This movement to and fro is labelled a state of doubt or suspension. If no crucial fact is re-interpreted which settles the matter one way or the other, we suspend our judgment till some such fact comes within our purview. It depends on the importance of the argument how long we shall debate within ourselves, while the completeness of the doubt is derived generally from the same source. In doubt we have a luminous illustration of topical reaction. The attention is bent on putting an end to the painful uncertainty; we seem to be looking for help. We throw the flood-gates wide open, so that the expected stranger may enter in readily; but at the same time naught else can pass, except when the attention flags. The nervous process is purposive. We do not cast our net indiscriminately, hoping that among our haul we shall stumble across the pearl of great price. We fish for the object, and for it alone; and frequently success rewards us. The need present is the stimulus which compels us to go straight for the mark, and it is also that which preserves us from wandering, if, indeed, we could wander in the absence of needs. It is this which decides that the process shall develop along a certain line.

In doubt there is something besides images connected with the topic, and that something is of importance, if only for the neural activity implicated: it is a thought feeling or combination feeling co-existing with the images, which tells us of what is going on in the workshop of the brain. When this is detected, we say that we are undecided. As the doubt grows stronger or weaker, so the feeling changes in force. This feeling is to us the doubt, and when the state of indignation is on the point of being removed, it changes, and we assert that the doubt is resolved. We must once more refer to our previous remarks. First, this feeling possesses no peculiar sign by which we recognise it, under all circumstances, as the feeling of doubt. The occasion determines our interpretation, and

* See Sully, *Comparison*, 1885.
a similar feeling on another occasion would bear a different label. Secondly, time fixes its meaning. Observing that a certain feeling is connected with a waver between decisions, it comes to be stamped with the same term as the wavering which it precedes, accompanies and follows.

When we hurry onwards in thought, or when a subject interests us little, the debate is short. As the feeling appears more or less decided, so we say "I doubt it" without a moment's hesitation. The same state, the same word-sentence. As in comparison, so here, we do not wait till the see-saw imagery emerges; we are satisfied with the premonitory feelings. In such instances, they form the basis of judgment, while the end of the process, the outcome of which they are, is foretold by their presence.

In quick thought, or when we view a microscopic section of it, this feeling is wanting; or, at all events, it is not easily recognisable or nameable. The doubt is raised and settled in the physical regions. In the secondary world we only observe the result of decisive neural activity.

In "comparing" and in "doubling" we assumed, for convenience, two objects and a resulting judgment. The number was chosen arbitrarily. Three, four, ten, twenty objects might have been involved. Largeness of contents does not change the value, as the principle remains the same.

What is asserted of doubt generally, is true of all shades of doubt. A similar analysis to the foregoing yields like conclusions if we study such graduated states as affirmation, denial or counter-connection, hesitation, belief or part-connection, conviction or perfect connection. [Study experimentally in chapters of a later.] In each of them investigation corroborates what is shown above as to doubt or semi-connection. Other conditions, too numerous to recite and many of which yet await naming, will probably yield result in consonance with the above analysis.

92c. — Generalisation, or Topical Reaction.

In grappling with any problem whatever, in doing anything at all, we act on general principles, i.e., we generalise. Let us examine a particular instance. [Test this.] We stay at a farm house, and we observe a labourer feeding the animals. In one styte there are two pigs, one lean and the other well-nourished, both of them taking their meal out of one trough. The labourer watches stick in hand. Frequently the sleek one glances round; it would like to drive r's lean companion away, but is cowed, since it knows the stick too well. Here we encounter the principle of generalisation. The animal acts as he acted before. A stimulus which once had an unmistakable effect, has the same potency now. What is true of one occasion holds good repeatedly, and of similar occasions. Had the pig not acted, generalisation would have been absent, and this power is proportional to the rapidity, delicacy, carefulness and sweep of the reaction. As living creatures vary in this respect, so does their ability to generalise vary.

The neural system is the result of adaptation, and consequently its manner of reaction accords with the surrounding conditions. The general order is matched by a particular one, and the latter is developed out of the former. This is true of the bodily functions generally. If food-stuffs changed their nature capriciously, and kept rapidly changing, the alimentary organs, being unequal to the strain put upon them, would succumb. The bodily functions are fitted only to an environment such as they are at present placed in or form part of. So with the brain which reacts in a manner conformable to the conditions under which it has developed. Transferred to an environment where reaction was uniformly irrelevant, it would fail. Within certain broad limits, then, the quality we are examining is useful to the individual and to the race. To act as we have acted before, is normal to all life, and indeed to things generally. Similar actions are everywhere followed by similar reactions. The greater capacity must be based primarily on the greater neural sensitiveness.

The generalisations of ordinary life are not formal; they are not expressed in words, feeling or images; and when they are so, they remain none the less organised. A certain object is remembered or observed, and when the same or any other closely resembling it
is met with, it is looked upon as an acquaintance. Careless thought points to the absence of schooling; reckless generalisation is its embodiment. Animal, child, savage, man of culture, all respond similarly to a repeated stimulus. There is nothing mechanical about this; for we do not necessarily re-act, and we are more or less circumscribed in this respect. Consider an example. A advises B., who is not highly intellectual, on some amusing matter. The advice is followed, and the episode has terminated. Suppose B. had suggested the same thing to A. Who is keen in detecting resemblances and acting on them. He, too, accepts the hint, and though not dreaming of any verbal generalisation, he nevertheless acts as if he had generalised in words. If he possibly perceives likeness on an enormous scale in most widely divergent directions. No re-collection perhaps survives of the incident which let loose the dogs of generalisation. From a formal standpoint he knows nothing of the various notions, i.e., he does not connect them into one system of thought. If in early childhood his nervous system had been well trained and he had continued to move among persons of his own type, the widest truths would come to him without the intervention of any verbal process. The brain in him reacts delicately, faint feelings alone being discernible. [Deliberately observe yourself whilst generalising.]

Suppose, moreover, that he instantly formulated the proposition: "Let everything be appropriately said, done and thought." Our problem remains unchanged. At worst, the words mean nothing. At best, they are a summation of previous incidents or a fore-shadowing of what will happen. The verbal generalisation is a formal generalisation, and so far an action which is repeated. As we give body to the words, with the assistance of the imagination or of research, so the verbal skeleton is clothed with an armour of flaky fact. Their value is instrumental. With the aid of words, since they are readily restated, we attain to new truths, and their merit lies in that the neural process corresponding to them is one, i.e., covers or superimposes itself. Hence a generalisation may appear irresistible to us, and yet be false, because the covering or the correspondence is attitudinal. If A is A, it is only because one stimulus is generally followed by one reaction. If the reaction were different, A would conceptually not be A. The fundamental properties of things give rise to the law of identity (see 185).

Generalisation is re-action, and neural sensitivity, acquired or inherited, is here the essential. Wise and deliberate training, and a judicious study of others, enhance its worth while thought and language express its method, but are not the capacity itself.

99d.—ABSTRACTION.

When a certain aspect of an object is singled out for inspection, we are said to abstract. Thus we may be thinking of the hands of a man, and neglect the man of whom they are a part. Like every human capacity, that of abstraction is, of course, susceptible of nice cultivation; and that is all one can say. Taking a large view, the reader will see that in all integration or observation we abstract what is integrated or observed. A particular human being whom we are observing at a particular time, is himself only perceived in part, while we also abstract the environment. The fact of abstraction, as usually understood, is of no psychological importance. As long as we cannot grasp the whole universe in a flash of thought, so long all primary and secondary systems are abstractions.

100.—ATTENTION AND COMBINATION.

The machinery which is to satisfy our needs might be considered as not complex, each need pressing it into service to the extent required. It might be said that when one need is satisfied, some other need will take the initiative, or, in default of a need arising for a time, the mechanism will rest. Some aspects, however, of the nature of the neural structure profoundly qualify and modify these expectations.
First of all, the facts teach us that the brain's working habits permit no rest in the waking state. Hence needs come to be connected with the mechanism itself. When there is thus no ostensible necessity to think, we are yet compelled to find some occupation. Casual happenings are then passed in review, and casual objects detain us for a few moments. Much of our time is thus idly spent in building castles on desert islands.

Again, the quantity of work put forth by the waking brain shows no sensible variation from minute to minute or from hour to hour, its capacity for labour remaining almost the same. We are compelled to attend to just so many details. If we are listless, we catch indifferent noises and are worried by otherwise indifferent bodily sensations; and if we are interested in a subject these noises and sensations are absent, their place being taken by other details, the same in quantity. Hence also the fact that if a task absorbs little of our attention, our thoughts are occupied with a second, third or fourth task, there being as many topics of thought as will make up the necessary round of details.

Once more, brain areas become prostrate when continuously engaged. Owing to this the neural work has to be distributed, the current of thought periodically shifting its direction; that is to say, under normal circumstances we do not satisfy a need at once, if its satisfaction is to occupy much time. We change the subject; we defer it; we measure out a little time to each of many needs. [Experimentally test.]

Moreover, whenever in thinking we meet with obstacles, we, as a rule, overcome them only when a strong need to persist is present. The capacity for tiring or exhausting work, or effort, is at first very small, slight insistence creating distraction and prostration. With practice, however, this ability, like other organic abilities, grows so considerably that in the professional thinker the more rational needs come to exercise a valuable control over the stream of thought. So habituated does he become to deliberate advance that he tires himself continually without having any suspicion of the fact or even against his wish. Between the keenest and the most lax attention, or betwixt the sleepiest doze and the most lucid effort, there is nevertheless only a difference of degree. There is no more a loading of dice, or a tampering with scales, in a great than in a small effort, or else the loading and tampering go on in every act without exception. No connection is traceable between great effort and indisputable awareness; for normally the effort which is made follows directly, no interconnecting or reasoning precedes, nor is there any near or remote consequence, and self-direction or self-consciousness present. Economisation is responsible for this result.*

101.—Economisation and Combination.

While it requires a chapter (ch. 3) to explain the theory of economisation in all its bearings, we must yet refer to one point. At the first blush it

*For a defence of the opposite view, see James, *Psychology*, 1890, especially i, pp. 453-4, and ii, pp. 573-6.
might be thought that only where several needs hotly compete for the field of attention will economisation enter as moderator. This is not so. Being an important function both in the primary and in the secondary order, it comes to be applied universally. Hence we economise everywhere, even where economy is superfluous, as when a need only partially drains the neural reserves. The process of economisation, like the process of attention, knows no distinctions, and jealously removes whatever may possibly exceed full measure. In this manner, the process being unconditional, waste is reduced to a minimum.

102.—Memory and Combination.

The matter of thought is drawn from the past. Hence we may speak of thought as the cross-classification of systems or the reproduction of what is relevant. Nay more, as all thought is re-developed, so all re-development is thought. Whether I see a book or open a door, as I have done on so many occasions, or whether I bring all my skill to bear on a problem, the issue is not affected.

Regarded in the above light, the process of reasoning assumes somewhat the following forms. (1) If a difficulty, muscular or neural, is given, we apply organically more energy to its solution, or generally speaking, we increase or decrease the degree or the quantity of anything which is under consideration. Thus the door yields to greater pressure, and an idea emerges owing to greater concentration. (2) We organically re-collect whether the same problem has occurred previously, and if it has, memory perhaps provides its solution. (3) We try to re-develop a situation alike in some few respects, with the same end in view as in (2). (4) We review the problem in the hope that the study of the difficulty may supply its solution. (5) We reconstruct our problem or a similar one, instead of merely re-developing it, and watch the results. (6) We systematically go over the problem, testing its every part by appropriate collection or examination. Individuals differ, of course, in the application of such methods. A highly developed system of education would, however, not rest till the best means of attaining the best results were discovered and duly taught to all and applied by all. At present bare chance decides what methods are resorted to by any one person.

103.—Habit and Thought.

An individual, X., reaches a certain sentence in a book, skips it, and goes on with his reading. If we unceremoniously peep into his brain we only discover that when a certain set of printed symbols was in sight, his attention rushed past them. If we ask X. the reason for his peculiar procedure, he is surprised at our inquiry, for he had not noticed the particular act referred to. If we press him to exert his powers of introspection, he is brought to acknowledge that we observed correctly, stating at the same time that he is at a loss to account for his behaviour. As we are interested, we continue our investigation, and learn that he always skips illustrations in an argument. We mention this to an acquaintance of his, who offers the following explanation. Some years ago this acquaintance had a long conversation with him, in which he convinced him that illustrations are
misleading. After this X. struggled hard to ignore them, until finally he reached the stage at which we found him. [Observe yourself as to above.] He had fully formed, as men say, a habit. Now this habit may be considered automatic since it seemingly lacks all relations; while the process involved in its formation may be regarded as typical of secondary activity, habits being, as it were, secretions of thought. Assuming, what we have seen is contrary to fact, that the secondary complication referred to is dead and has nothing to do with the psychologist, we must inquire into the nature of the process which led to the production of the habit. The reply we obtain amounts to this. A certain need is present. In the course of its being satisfied, many vistas are explored. Finally, a resolution is arrived at; the man persists in its application; and the formative process and the resolution are after a time forgotten. However, every line of thought which was pursued, the resolution arrived at, and the persistence in its application, were themselves due to secondary complications. The need itself was likewise the result of previous activity. All that we learn, therefore, is that: when a new need is evolved, a familiar process is set going which ends in the construction of a secondary complication. Hence when we are said to deliberate, we act from habit as much as when we are said to act without deliberation. Had it not been for the multitude of fixed acquisitions of which the process consists, the process would be unintelligible; and as these acquisitions decrease in number, so the problems to be solved have to be simplified proportionately. We are, then, driven back to the structural aptitudes with which the infant is equipped, and we must also inquire into the origin of our needs. We cannot arrest our backward steps until we reach the time when life’s drawbridge was lowered, since inquiry shows that the process of economisation begins with birth, and that the complexity of thought evolves with growth and with the complexity of the neural structure.

The human organism, seen in this light, may be regarded as a bundle of habits. Hence arises the question as to how these habits arose. Taking the history of a man to be one with the history of life, we might argue that the habits inherent in the human structure take their origin precisely as did the habit of ignoring illustrations, which habits, again, are inherited by the next generation. Plausible and suggestive as such an explanation may be, it proves of little value on examination. We saw that the formative process becomes simpler as we retreat to infancy. Hence as we straggle backwards to the amoeba, we are still left face to face with the initial problem. Each habit has been, it is true, acquired; but habits were responsible for the acquisition. Thus we may descend in the pit of life till the phrase “formation of habit” loses all meaning.

We have assumed the transmission of acquired tendencies; but this is a doubtful doctrine, since variations in the germ, sifted by natural selection, are the chief present-day explanation of the animal structure and of instincts. As far as the matter is open to scrutiny, there seems little reason to doubt that acquired habits or characteristics are but seldom transmitted.
What is true of the habit-forming process, holds good of the needs which are the stimuli to action. These, too, have their roots in favourable variations which have been preserved by natural selection. From the very dawn of life, want and satisfaction of want have been intimately related, and the neural system has developed along lines which best connect and satisfy these.

Moreover, no other explanation of the development of thought appears for the present feasible. If what happens is not in general accord with this suggestion, what is the alternative theory? There seems no reason why we should go behind the principle of growing complications in the individual and the preservation of favourable variations by natural selection. The elaboration of complications would thus result as a consequence of the evolved variations.

Prof. Ward (Psychology, 1886) is responsible for the very ingenious theory criticised in this section. The same view, alike in detail, is expressed by Wundt, Psychologie, 1893, ii, pp. 575-17, also in Wundt's 1880 ed., pp. 455-8, 88 years before the publication of Ward's Article in the Encyclopaedia Britannica.

104.—INTERDEPENDENCE AND INTERACTION IN COMBINING.

The problem of combinational sequence would be easy of solution if one bare image followed spontaneously another bare image, and that another, and so on. In such circumstances we could readily describe the evolution of a process of thought. The actual situation, however, is far more complex. Now one image develops out of its predecessor; now another puts us on our guard; and again the sensitising of one area has for its accompaniment the sensitising of half a dozen others to a more or less intimate degree. The entanglements to be considered are sometimes highly complicated. So also with the needs. While one leading need may more or less control the current of thought, it is yet at frequent intervals crossed by subsidiary or secondary needs. Every bend in the stream of progress gives rise to a little eddy capable of considerable development. The central need is like a farm bailiff who has a crowd of intelligent men to help him in the management and working of an estate. While each subordinate performs a particular task in his own way at any time, he is yet capable of performing others, even to the extent of playing a leading part, as, e.g., in the bosom of his family. We may, without straining, carry the analogy much farther. (At bottom it is more than an analogy.) On the one hand, the bailiff is a complex product himself, almost entirely dependent on his environment. On the other, he would be paralysed if left to his own devices. His very existence presupposes the existence of others of his kind, and for them his office would be an impossible one. To drop metaphor, a need can only be reasonably satisfied when the means to its satisfaction lie to hand. Secondary complications must be in readiness to twist the rope which shall haul the want towards its object. Without these subsidiary needs and complications, the need will fail to be
satisfied, and this nearly always happens where there is a sensible departure between the present and any former need.

Let us analyse a simple instance. I say to myself "Have I seen that face before?" Here is a face, the ready apprehension of which is connected with a marginal feeling of familiarity. This first stage is the fruit of a curiosity which is ever developing when circumstances are favourable, and thus when we are not absorbed, the reading of a face will carry with it an attempt to connect it with something. Hence B, the marginal feeling, develops out of A, the seen face, the two forming one secondary complication. When, however, we are somewhat absorbed, the process is restricted and the marginal feeling does not develop. What we are specially bound to notice is that the seeing of a face results in a marginal feeling only under special circumstances; that this marginal feeling is secondarily connected; and that given the existence of A, B will find its explanation in that existence. As with A and B, so with C. The marginal feeling, under the conditions develops into the sentence we have quoted, and what is implied in it; and that, again, develops into a secondary attempt to reproduce what is pertinent. Thus, allowing for further complexities, we can see that the total process explains itself.

A more complex instance, like that of sending written information, is resolved in a similar manner. When the sensitising of one area products the fainter sensitising of several others; when a word or a sentence is again and again examined and corrected; when notions of succinctness, clearness and completeness assert themselves; when difficulties are reduced forcibly or by stratagem, when the wandering from the subject is resisted: in each case the connection is final and determined by the past. Each of the subsidiary needs and complications develop in the way common to them, and only to the extent necessary. Modifications there are many; but these are decided by the principles which we have insisted upon. Allowing, therefore, for a realm of needs where individual distinctions are as various as in a monarchy, the neural processes form their own explanation.

It might perhaps be advisable to describe exhaustively some train of thought from this point of view; but the difficulties to be encountered would scarcely repay the sacrifices made. Best of all would it be if neurology were sufficiently advanced to enable us to lay bare a process of thought from beginning to end. Not until this has been accomplished, can we speak authoritatively of general facts of psychology.

105.—History of the Subject.

From the beginning of speculation, thinkers have been impressed by the fact that some intimate relation exists between the more striking systems as they emerge one by one. Explanations, like those of Aristotle and those of Hobbes naturally did not pass beyond the recognition that thought represented a cosmos and not a chaos. With the rise of the physical sciences, especially under the influence of Bacon and Descartes, the matter was inquired into more exhaustively. Locke’s casual judgment
concerning the Association of Ideas rose in general estimation, and was elaborated by Hartley into a vibratory theory, while Hume had already claimed that the Association theory was to psychology what the law of gravitation was to physics. Still, as the physical mode of inquiry took advantage of instruments and mathematical treatment, and as these did not seem applicable to the realm of thought, reflective scrutiny retained the field, though disguised by an outward sternness not its own. So comprehensive and simple did the laws of association appear, that thorough research was unfortunately discouraged, the completer formulation of the laws being the main concern of psychologists. This task was carried out to a high degree of perfection, but with little new light as regards the factors determining the flow of thought, by Brown, the two Mills, Bain and Spencer.

At the beginning of the nineteenth century the mathematical development of the physical sciences made a profound impression on many minds. As one legacy from that age we possess Herbert's system of psychology, which is a bold attempt to transfer the method of mathematical mechanics bodily to the secondary realm. His failure, however, was unavoidable, for, misled by speculation, he concluded that sense systems were not properly amenable to observation, and that the kingdom of knowledge could be forced by ingenious hypotheses. Herbert apparently did not see that the simplicity of physics was the result of centuries of arduous research (sec 2).

Meanwhile the biological sciences were growing in importance. Hence we find a larger measure of acceptance accorded to Paulhan's theory of systematic association, a theory which ascribes that thought radiates from a centre and is controlled from there. Curiously enough Paulhan, like his predecessors, neglected to obtain the bulk of his material by a direct study of data, and he offers us, therefore, as regards the flow of thought, little of importance beyond his great learning conception.

The only rival to the Associationist school has been the metaphysico-psychological school, the best English representative of which is, perhaps, Dr. Ward. He recognizes that the old metaphysics are unpalatable to the common mortal, and he strikes, therefore, a compromise. He starts with an unanalyzable individual or subject to whom presentations are presented in an unanalyzable way. These presentations give rise in an unanalyzable manner to unanalyzable feelings and these cause an unanalyzable reaction in an unanalyzable fashion. We have thus superfluous theorising of the usual type ruled out of court, the non-essentials of the structure, important in their way, being solemnly handed over for scientific treatment. We must nevertheless allow for two advantages gained, exclusion of metaphysical discussion and an organic or teleological standpoint.

From our predecessors we adopt here the opinion that the process of thought presents a cosmos; that association is systematic; and primary and secondary processes are teleologically determined. As regards method, we start from the position that the criticisms on the introspective
method are markedly at fault (sec. 4). This granted, we are enabled to approach our facts in a critical mood. We endeavour, accordingly, to observe at first hand, most minutely, most widely and most repeatedly, varying the conditions until further variations prove barren of new facts. Attempts must then be continually made to discredit any supposed conclusion postulated; to show that it proves too much, or too little or nothing at all. In a similar spirit any proposition arrived at must be systematically extended, to the uttermost limits of the universe if practicable. I claim for the method thus deliberately adopted the name of experimental, and I hold that it is a method which should be pursued in every class of research (sec. 9).

Our view, then, is throughout organic in conception and of an experimental character. The complex secondary world is to us a reflex of the complex primary world, and the origin and growth of the former a reflex of the origin and growth of the latter, though in the final analysis, as we shall see in sec. 176a, the body is but one complex object of existence. We also feel bound to reject the speculative theory of psychophysical parallelism, owing to such facts as those of needs, attention and economisation (sec. 180). We prefer to believe that research will show matter and mind, the primary and secondary world, to be strictly one, parallelism being out of the question (sec. 180).

106—A Bird's Eye View.

Owing to the nature of the human structure, as determined by natural selection, needs tend to arise and to satisfy themselves, the method of their satisfaction being outlined in the inherited and adapted organism. Ideally speaking, given the need, full satisfaction should follow at once, in which case there would be but one stop in every process. Since, however, the structure is imperfectly adjusted, the process of satisfaction or readjustment is frequently long, tortuous and unsuccessful, and that more or less prolonged attempt at satisfaction or readjustment, embracing observation, memory, action and thought in every form, we call the process of need satisfying reaction.
CHAPTER V

SYSTEMS AS RE-DEVELOPED

As vibrations cease to be,
So our memories fade and flee.

107.—PRIMARY SYSTEMS IMPLY RE-DEVELOPMENT.

Walking along the streets at night my gaze fastens on the flame of a street-lamp. I see the transparent circular space immediately round the jet I note the burning gas encircling this clear round space; I observe the silver colour of the light; and I gather that the flame, at its outer fringe, is in constant motion. I know, besides, that the gas presses out of the pipe, that chemical processes take place, that heat is evolved, and the like. At present, however, we are only interested in what is directly apprehended, and not in what is indirectly connected in thought with what we observe (sec. 15).

In ch. 2 we learnt that every reaction is the outcome of need stimulated attention, and that apart from the exercise of attention, colour, light, shape and objectivity are non-existent. We cannot, therefore, allow that we are ever passive when integrating anything. The system, be it a sight, a memory or a feeling, does not “present” itself to us; it is evolved with the assistance of bodily and environmental, or intra-organic and extra-organic, stimuli; it is membered (sec. 80). Considering the fact that we just stated, it is natural that a treatise on psychology should not open with a chapter on the senses,* for instead of primary systems, or sensations and perceptions being primitive, they depend on a variety of circumstances which, accordingly, must take precedence of them in a psychological discussion.

If my apprehension of a flame was impossible without attention of an advanced kind, then, by implication, another important factor participated. In ch. 3 it was shown that neural processes, like muscular activities, were affected by appropriate exercise. Hence my seeing a flame was not an event which related to the present only, for it depended to some extent on

---

* So James, Psychology, 1890, ch. 17.
residual effects. To speak precisely, I re-attended, I recognised the object. In other words, re-development entered as one of the factors in the membering. [Experiment.] Had I never before seen a flame or any other object, nor ever met with anything, I should not have noticed the light. I should, metaphorically speaking, have passed it by. Indeed, were we fully absorbed or were the attention massed as in a desperate attempt at re-collection, no flame, no colour, no light, no shape, no motion would be apparent (sec. 14).

Memory appears even in the simplest primary system in the form alluded to above. It also finds entrance by a different channel; for it happening implies duration—a lapse of many moments of time. [Test] No system, consequently, exists exclusively in the now, each primary system being a time complex. If every element of a developed system instantly vanished out of the sky of existence like a flash, we should never meet a system as such. Besides, we should not obtain a lasting impression, for what is given would be disintegrated moment by moment. Indeed, as we have seen (sec. 19, third conclusion), every sensation or image is an after-effect.

Hume's psychology was delightfully simple, advanced though it was for his age. In his (Inquiry, 1748, sec. 2, and Treatise, 1738, bk. 1, part 1, sec. i) there were, on the one hand, only impressions or feeble perceptions, such as are implied in hearing and seeing; and, on the other, ideas or feeble perceptions, such as are implied in re-membering a sight or sound. Thought meant for Hume the ascription of feeble perceptions or ideas through their inherent relations of contiguity, resemblance, and cause and effect. He recognised no organism adapted by natural selection for ready action in certain directions, and he also did not allow for the highly trained brain of the developed human adult. He did not notice that the visual or tactile image were elaborate products surrounded by a variety of feelings, equally complex, which he seemed unaware that these images were only insignificant portions of an extensive whole. Once we have learnt the complicated nature of the image, and the far more complicated environment with which it forms the idea or unit of thought, Hume's psychology, in this respect, becomes as mythical as are to us the gods of the Greek pantheon.

James Mill, and, to a great extent, Bun and Spencer remained true to Hume's naive classification. Most writers, however, have more or less left behind them the older view. Sully (Human Mind, 1892) sharply divides sensations, perceptions and images. He thus defines the latter: "A sensation may in a manner be defined as a simple psychical phenomenon resulting from the stimulation of the peripheral extremity of the afferent nerve when this is propagated to the brain. . . . Thus the stimulation of a point of the skin by pressure, or of the retina of the eye by light, gives rise to a sensation (I, p. 81).

Simple sense receptacles, however, he rightly argues, do not exist in the adult, nor, as I hold, in children. The normal minimum is a perception which he defines as follows: "The localising and the objectifying of sensation, make up together what we commonly understand by perception" (I, p. 207). That is to say, the immediately given sight or view of an orange is considered the sensation, while position, and the involved smell, weight and jucness, together with the observed figure, are said to represent the percept. As we have seen in ch. 4, this mechanical method of explaining occurrences, by arbitrarily stringing together a few selected systems is unwarranted, for in a percept or idea, or in a unit, we meet with a process which defies the application of notions derived from elementary mechanics. A large part of our total past, a sublimation of innumerable facts connected with oranges, our attitude towards fruit in particular and pleasure in general, all go to form the logical idea of an orange, while the actual idea is
generally empty apart from a context. The smell, weight, position, etc., are only microscopic portions of what the developed idea presents us with." Again, "By an image," Sully says, "is meant the ideal copy or representation of the percept" (Ibid. 1, p 199). Here again I dissent. The image, surely, is a repetition of the sensation—of the empty idea, of the bare sensation—one of Hume's feeble impressions which tells us nothing, without a setting or context (sect. 124). When, for instance, I think of a cherry in terms of sight, the image is no more a representation of the percept,—of what is connected with the sensation, with the bare sight,—than the sensed cherry of which this is a copy. We may define an image as the complement of a sensation, and the word idea as the total state when a number of connected images are present, image or reality, or both, thus complementary to sensation or pre-integral, and idea or re-compounded sense, instrumental to percept or pre-compound. Or to put it otherwise. A bare picture of a house with no interpretation put upon what is seen, is a sensation, or a pre-integral; but the picture interpreted as useful, large and habitable, is a percept, or a pre-compound; the latter picture re-developed, is an image, or re-integral, and the re-developed picture interpreted as useful, large and habitable, is an idea, or a re-compound. The stuff of which a particular sensation is built up may be termed an element, and a sensation may be regarded as a primitive percept. Or we may draw up the following scale, based on units of various degrees. 

<table>
<thead>
<tr>
<th>Degree</th>
<th>Element</th>
<th>Sensation</th>
<th>Unit of the First Degree (u)</th>
<th>Precept</th>
<th>Unit of the Third Degree (u)</th>
<th>Subcombination</th>
<th>Unit of the Fourth Degree (u)</th>
<th>Action or Combination</th>
</tr>
</thead>
</table>

James (Psychology, 1890, ch 9 and other places) insists on the complexity of the reactive state. "Like a bird's life, 'thought' seems to be made of an alternation of flights and sinkings... The resting places [are] the 'inertive parts,' and the places of height the 'transitive parts' of the stream of thought" (Ibid, p 243). He also says that "the concept... differs from perception only in the extreme simplicity of its object or content (ibid, n, pp 12). In fact, the difference between the highest and the lowest product is one of degree, the simplest sensation equally with the most comprehensive combination being an organic outcome, while psychic functioning must not be interpreted in the light of a mechanical or chemical method, for its conditions are its own, those of the inherent complication. No process such as vision (Hoffding and Binet), assimilation (Wundt, Sully and others), complementation (Ward, Stout and others), mental chemistry (J. S. Mill), yields more than a hint of what is a simple and peculiar result of economization. Neuril feelings, such as those involved in doubt or belief are no more likely to make neural changes ineluctable than muscular feelings make muscular changes intelligible. Prof. Ward (Psychology, 1896, p. 57, sect. 2) distinguishes sharply between sensation and representation, saying "whereas there can be a mere sensation red... we can only have an image or representation of a red thing or a red thing," to which the reply is that every system, however simple, is equally valid created, and, therefore, has equally humanhood or formhood, and that corresponding to the "mere sensation red" there is a "mere image red." 

See for definition of terms, Lewes, What is Sensation? 1876; Turner, The Senses in a Course of Psychology, 1889; and Davidson, Perception and Sensation, 1881. Herbert speaks of sensations as "those simple presentations which are called sensations [imprimatur] when we wish to point to the moment of their first appearance." (Psychology, n. 1, 1831, p. 52), and a presentation is to him the rebound of the soul when disturbed (Ibid, u, p. 470). As to sensations, see also n. 102, of the quoted work, and Souris, Les Sensations et les Perceptions, 1883; Bonnich, Les Sensations et les Perceptions, 1884; Mcoin, Uber Begriff und Frischent des Empfindung, 1888-9; Pasol, Comment la Sensation Devient Idee, 1891; and Scripture, Zur Definition einer Vorstellung, 1891.

It will be evident from our analysis that we cannot examine an object bare of details for more than a microscopic period without the attention wandering. [Text] Usually, therefore, because it occupies time, or for
more serious reasons, we take account of a variety of fresh details. Yet we never do, or can, attend to an object to the extent of exhausting its meaning.

Brentano, and with him Stout and others, are at pains to distinguish between the object as thought-of and the object itself. Psychologically the distinction is illusory. The world, to the psychologist, I take it, is one, the object and the object-as-thought of being indistinguishable theoretically. To identify a smell as pointing to an object, say, an orange, is to infer a complex of which the smell is one expression. This I shall attempt to substantiate in ch. 8. The object-as-thought-of is thus a partially exhausted system and the object itself a system regarded as wholly exhausted.

In the instance cited, i.e. of the flame, we have, of course, consecutive development, and of this we may now speak.

108.—The Persistence of Neural Modifications.

While staying in Paris I visit the Louvre, and among the art treasures there I notice the Venus of Milo. Just to glance at the statue would be insufficient, for much would escape me. I, therefore, approach the figure. My eyes swing repeatedly in various curves to drink in the pose, the proportions, the outlines, the detail and the conception. In accordance with the interest aroused by any feature, so do I examine it or recur to it. Some considerable time is occupied by my scrutiny of the masterpiece. If, on moving away from it, I were asked for a full description of what I had observed, I should be able to reproduce pretty nearly all that I had remembered. Probably little would have been forgotten. [Taste the fulness of memory for short periods of seconds and minutes.]

Let us be more precise. After one minute's experimental thought several dozen details are developed which were taken account of during that short time (sec. 219). An argument occupying no longer a period, is in this way re-developed almost completely, and only the organic feelings, the setting of our images and the exact language employed, are omitted. Again, one day, about 4.30 p.m., I begin to be engaged in a conversation lasting about twenty minutes. [Take notes, after the event, of such a conversation. As we converse, I put down single words, forty-three in all, to represent the headings of the talk. At 9 p.m., I start writing,—not having thought of the conversation in the meantime,—and finish about 11 p.m. Almost the whole body of matter is re-membered—on 240 details, though perhaps every single detail of that conversation would have been forgotten in the ordinary course during a twelvemonth. Again, during the day I have been reading with constant interruptions Henry VIII. I started reading about 10 a.m., and finished about 6 p.m. At 8 p.m. it occurs to me to test how much of the play I am able to recognise as familiar. I look at many hundred lines here and there, and notice that nearly every line has a familiar ring. Yet probably I had read that very play years previously, and cannot re-develop a single line, leaving aside often-quoted passages. [Imitate this experiment.]

Memories continue faithful and complete for some time. Were that not
so, intelligence would cease. This persistence alone enables us to observe objects, such as landscapes, palaces and streets, or to study closely what is minute. If the view of an instant ago disappeared immediately, we could not lucidly apprehend anything. As it is, for a certain short period after an event is past, we can remember what happens to us with almost absolute fidelity.

A melody exists in time and is not inordinately long: one which lasted a whole day could not be understood. So also the notes of a melody are not far removed from one another; if these occurred at intervals of ten minutes, it would be hard to detect a system in music or to appreciate it. As the matter stands, the musical notes follow each other closely, yet not too closely, and the theme is not unduly prolonged. Hence, since the parts are well re-developed, the melody is easily grasped. If each note ceased to exist as soon as it was heard, the meaning of a melody would be unknown to us. If the reverberation subsided quickly, only melodies of the shortest range could be apprehended.

We must here guard against a possible misunderstanding. Bound as we are to employ the language of common life, it might be thought that the various notes—the sound systems—persisted until the last one reached our ears. Such is not the meaning intenders in the preceding paragraph. We rather mean that something reverberates which represents the notes. When we are listening to music and examine ourselves from moment to moment [you should do this] we find no notes there except those we are actually hearing. What we discover are feelings which had accompanied them and which persist. Note after note seems to affect the feelings, and each succeeding feeling modifies its predecessor. In this way a melody is understood as a whole. [This should not be determined physically.] The music does not lie wrapped up in the notes, but in the successive feelings which these awaken. The former owe their importance solely to the feelings by which they are accompanied. At the same time, either a repetition of the note in some form, or a partially identical feeling is normally essential to the reawakening of the accompanying feelings. Seeing a certain person in the street, a certain feeling of this nature develops, as a result of which I usually try to think of some one who had aroused in me a like feeling; or, as sometimes happens, the feeling—the summary feeling—stands by itself and is not followed by any image. [Examine such instances.]

As we have learnt in the previous chapter, this feeling varies indefinitely as to quality, and thus one secondary sight system seems to be developed directly by another. Hence, in the creation of metaphor the partial identity in the summary feelings is much closer than the connected sight systems or images which are frequently most disparate. In moods and in neural excitement it is equally observable that a feeling can be indifferently followed by a related feeling or by a secondary audible, visual or other system. [Test the.] It is, therefore, to be noted that feelings are not returned by images, as lawyers might be by their clients. Of course, in the last resort the relation between successive primary or secondary systems of every type is best determined neurally.

What is asserted of music holds generally. Series of sights and sounds are not as easily re-developed in completeness, as are the summary feelings which follow them. Similarly, structural elaboration does not take place among the products of the five senses, since these products do not admit of readily synthetic treatment. For the present this brief reference as to the place of feelings must suffice.

A feeling, such as that of hunger or thirst, as Paushan says, may occur repeatedly without being aroused by a similar past feeling. So also the peculiar impression which similar persons often make upon us is a primary fact and not necessarily connected with similar facts in the past. Once the feeling exists, we organically re-integrate perhaps a
face which had at some former time aroused a similar feeling. In cases where the feeling is frequently developed, it may lead to the development of similar feelings or images. It is a common opinion that feelings are re-producible by images, but that they cannot re-produce images or other feelings (sec. 71). Thus, for instance, Höffding tells us that “feelings are remembered by means of the ideas* with which they were originally linked” (Psychology, 1891, p. 241). Nay, he goes further, for he argues that “it is easier to recall images than the feelings which accompanied them” (ibid, p. 241).

The intelligent grip of any conversation, argument or speech, depends on the relative persistence of neural modifications, and in the absence of such persistence a speech would have to consist of a solitary syllable or letter. It is on this trustworthiness of the memory that we rely in conversation. The reasoner would be confounded if he were uncertain of the drift of an argument, and the debater would be at a loss to read his notes or to answer his opponent.

Normal development takes place in time. We are, consequently, dependent on our memory. It immediately after asserting that “normal development takes place in time,” I forgot what I had uttered, or grew doubtful, coherent thoughts would become impossible. As I am at the present instant writing, I re-develop from moment to moment sentences without any notable effort and without ceasing to write or to think. If it were otherwise, no one could even set down on paper a closely reasoned argument, for the attention would be skipping like a stone hurrying down a sharp incline, or it would be moving hither and thither like a helpless shuttle-cock at the mercy of eager players.

Every kind of development presupposes a memory which for short periods is almost mechanically correct. What would happen if re-development were either flawless throughout or never trustworthy, may be left to the imagination of the reader.

109. - Neural Excitement.

There are few persons who have never lost their equanimity and the surface of whose soul has never been ruffled. In speaking, then, of anger we refer to no uncommon fact. It is nevertheless not every aspect of this fact which we wish to analyse, but only one. When on a sudden we are violently agitated, as is a river on the launching of a vessel, it is no easy task to allay the agitation. Last Sunday you were seriously annoyed. A friend did not keep an appointment, and you were walking up and down in the rain waiting for him for an eternity, as it seemed. Notwithstanding your annoyance, you did not give vent to your feelings. You considered that it was idle to fret. Being in an experimental mood, you endeavoured

* Here the idea is considered as a visual or auditory image in Hume’s sense. I hold, on the contrary, that a visual image, like a visual sensation, has meaning only in proportion to the greatness of the universe of thought with which it is connected. I may, for instance, remember a visual system, without knowing whether it is observed, imagined or re-produced, or whether it represents a painting once seen or a past event (sec. 124). Yet even here the idea forms part of a larger system. See also Titchener, Affective Memory, 1895, and Affective Attention, 1894; Ribot, La Mémoire Affective, 1894; and Paulhan, Les Phénomènes Affectifs, 1885.
not to be irate. All in vain! One set of moody thoughts was scarcely dismissed before another set developed. The cheerful prospect which you fixed on was dominated by a sullen gloom. Perhaps it took several hours, or a day or two, to re-establish your reputation for serenity. For this reason, just as the effect of dropping a stone into a well leaves the surface blurred for a measurable time after the object is buried in the soft bottom, so excitement survives the factors which produced it. Thus anger, once aroused, is not readily calmed. For hours it sometimes haunts us, and will not yield either to persuasion or to a command. We assure ourselves repeatedly that there is no occasion for being angry, but yet we are ridden by a fiend.

The feeling of anger is not the only wave which thus tends to propagate itself, for our notions correspond with the mood we are in. The thoughts in a mean mood are accordingly disagreeable, carping and critical. If we are weak-minded, these sickly imaginings persist in swaying us until the last echo of our wrath is overtaken by silence. Perhaps the condition is prolonged even beyond that stage till, suddenly, as with a young child, a warm sunshine thought dissolves the mists. We observe also that as bright thoughts momentarily prevail, so the tempest is in abeyance.

Anger is a mood, and what we affirmed of it, holds of moods in general. Have we not sometimes felt so buoyant that we could not resist the temptation of jesting at death? Or so morbid that trifles have made us despondent? Or so sane that we could defiantly re-integrate and rigidly scrutinise what normally would make us tremble?

Anger is a mood, and what is that? How far must we be stirred before we dare suspect its presence? I venture to reply that there is no line of demarcation. Every state that we are in shows symptoms of it. Everything, however trivial, affects us, and gives rise to a mood. Every percept or idea has its halo of persistent feelings (sec. 149), feelings which are the equivalent of neural excitement or a mood.

Four statements at least are deducible from the proposition that combinations, in one of their aspects, are universes of moods. First, every line of thought or action is swathed in a mood, as referred to in sec. 149. Secondly, every mood persists for a longer or shorter period. Thirdly, each mood is accompanied by topics or details congenial to it; and fourthly, every mood, for a time, resists dismemberment, tends to recur when dismissed, and re-develops when the attention otherwise flags.

110.—Sudden Re-Collection.

Armed with these generalisations, we will attempt the solution of a special group of memory problems. Let us, for this purpose, re-analyse an occurrence of this order (sec. 43). I try to re-develop the second verse of a poem with which I am acquainted. After repeated and vain en-

* "Mood, that is a sum of relatively permanent organic modifications colouring the tone of mind" (Sully, Human Mind, 1892, ii, p. 58).
deavours, coming back again and again to the subject, I turn my attention to something else. Suddenly, in the midst of some evolving notion, the lines rise mechanically, like a cork released under water. What explains this sudden reappearance? Was there anything which dragged these to the surface, or were they, with malice intent, re-developed? Both these explanations must be dismissed in view of the principles which have just been enunciated. We are forced to believe that the neural excitement continues, though the feeling stage exhibits no appreciable proof of such continuance; that the process of searching for the lines persists neurally; and that the sensitive area does not completely regain its equipoise.

[Study experimentally]

Consider another instance. I have an engagement for a certain hour, and I am anxious to keep it. Repeatedly during the day the fact is redeveloped. Occasionally it happens, of course, that one thing or another suggests the engagement, but, generally, recollection by development or association, not directly traceable to the surviving excitement, is exceptional. As far as the current of thought is concerned the notion of the engagement is re-integrated spontaneously. The neural sensitiveness has not departed.

Often a tune haunts us. It matters not whether we have any objection to it or not. If we have none, our whole day's thought is interlaced with that tune, and were we to observe the texture of systems under these conditions, we should find that the tune inserts its threads arbitrarily. We should discover that no idea or combination maintained its unity long. We are not, however, in a better condition, if we do object; for, in spite of our defiant attitude, we remain helpless. The tune comes and goes,

and the precious minutes run to waste. If we are wise, we become reconciled to our fate.

[Watch such events minutely]

Take another example. For an hour or so I have carried on an animated discussion with a few friends. I leave them because I have to prepare a lecture. Yet, though I am bent on nothing but my task, I am persistently interrupted by irrelevant thoughts traceable to the discussion. More than an hour passes before I can settle down to my work. Meanwhile, argument after argument is re-incarnated or suggests itself, point after point is weighed, while I am ostensibly attending in a direction un related to the discussion. Many a subtle aspect which was overlooked, many a fallacious inference, many a striking reply, Startles me, as if an irresponsible phonograph were at my side, and casually broke in upon me. It should be noted that the momentum given to the topic is slow in exhaust ing itself; and also that the whole of the thought process is not equally reflected on the mirror of the immediate present.

[Test such a case]

Again, I am learning shorthand. Wherever I go—though I have dis missed the subject more than once with a gruff Amen and without a blessing every sign over a shop, every out-of-the-way term which rises in the course of thought deflects the stream of attention, and I begin to test the words phonetically. Apart from a sensitised brain area this fact is mean-
ingless. Why should a sign-board suggest shorthand questions when there are oceans between my passing thought and that subject? Why should combinations be repeatedly bisected by irrelevant propositions? [Note such cases and also induce them experimentally.]

We have reviewed a batch of occurrences which, though not uncommon, cannot be said to abound: Another category of instances is often met with. I am to ask Z. a certain question when I see him; I am to call at such and such a bank; I am to verify a certain passage; or I am to rise half-an-hour earlier. In many of these cases complication or association is a seeming force for seeing one object I re-member another: but why, for instance, should the entrance to a certain bank suggest to me that I am to call there? The reply must be that the mood persisted, and that the physical area was still highly sensitive. We should quickly notice the difference if that were otherwise. [Analyse such cases.]

IIIA.—The Nature of Recency.

The fact of recency and sustained attention finds its explanation in neural excitement. Bain casually refers to the nature of recency: "It is a primary law of all impressions whatsoever, that, for some time after they are first made, they come back readily to the consciousness, even without an express associating link . . . All this is perpetually exemplified in the recollections involved in our everyday transactions" (Senses and Intellect, 1894, p. 599). An extreme illustration is to be found in the fact that owing to the slow fading of sensations, we have apparently no sense of darkness when shutting our eyelids in the ordinary course, not even when we deliberately experiment. What is more, the eyelids may be shut for a considerable fraction of time, and still no darkness be perceived, the image persisting vividly while the eye is closed and thus spanning the interval of no-vision. (See also Child, Statistics of Unconscious Cerebration, 1892.) Brown (Lectures, 1824, ii, p. 376) ingeniously suggests the following explanation: "When we sit down to compose, the thought of our subject is soon associated with every object around us, as with all that we see,--with every permanent sound, --with the touch of the pen or the pencil which we hold,--with our very tactual or muscular feelings as we sit." Experiment corroborates Brown to a very slight extent; but his contention proves far too much.

The precise nature of the recency factor is not easily determined. I shall, however, attempt here an analysis of the factors which enter into the problem before us. (1) All that is barely attended to--and in this we must also include the various feelings which most persistently accompany the processes of seeing, hearing, touching, thinking, acting, etc., as well as the outer margin of any sensations, etc.--is forgotten almost at once, is difficult to re-develop, and hard to recognise. That which does not fall near the focus of interest has an equally ephemeral existence. (2) An event may powerfully impress us. We may, for instance, have been so frightened that the heart is almost still and the whole body is violently affected. Here the effect will naturally last beyond the moment of fright, and the equilibrium will be slow in returning. (3) As we shall see (sec. 134) what is exciting may be inhibited by abruptly turning the attention away or by a new and strong interest diverting the trend of thought. In these instances, what would otherwise powerfully appeal to us for some continuous period, is soon dis-integrated. (4) What has been stated in the two preceding sentences suggests that facilitation, which is the opposite of inhibition, may be a factor in recency. That is to say, instead of a topic being sharply dis-integrated, we may linger over it and only half-heartedly leave it as new objects appeal to us. In an obvious case of this kind, we only confusionally attend to what is more recent, for some of the attention is still absorbed in what has previously passed. This suggests that (5) the persistence of what is recent may be to all intents and purposes an acquired habit
or a complication. According to this interpretation we, perhaps, generally dwell on what is recent, while we only partially allow the attention to stray into new fields. From this it would follow that much at least of what has recently occurred, recurs with seeming spontaneity because it has never properly been outside the field of attention. When we thus wish to be able to re-develop a certain fact for a short time, we only imperfectly readjust the attention, facilitating in this way an easy response when occasion offers. A large portion of recency, as for instance recurrence to a topic after an interruption, may therefore be said to exemplify the particular acquired habit of only partially dis-integrating what has very recently occurred, and this habit is encouraged by the nature of the organism. (6) What is recent, apart from the fact that immediate oblivion is not uncommon, has by no means always the advantage over what has passed long ago. Already in sec. 60 we have seen how easily an established trend triumphs over a recent resolution. The fact is that what we have known well for a long time offers a positive obstacle to the learning of what is recent. Old notions, old incidents, old habits, old sympathies, can, therefore, with difficulty be supplanted by new ones, and are more readily re-developed than the new ones. To illustrate, I spent two days sight seeing in a certain town, and for ten years used to recur to the sights I had seen there. After this period I visited the town again—for eight days this time—and yet the recent views failed to leave a lasting impression. Indeed, the life of thought has regard to established interests and knows naught of barriers of time. [Test this paragraph.]

The nature of recency is thus more complex than might at first be assumed.
attract us for some hours. In an average person’s life few days pass without some excitement which tends to be spontaneously re-instated during the hour or day. A battle has been fought, a speech has been delivered, a storm has caused disasters, a friend is ill, an interesting letter has been received, a peculiar notion has struck us, and so on; or else business, the family or amusements, form the staple of thought. After several months most of these incidents are re-developed with great difficulty; after several years a ragged remnant only survives. Yet not only does almost everything suggest the interesting call we made an hour ago; but parts of the incident are re-instated spontaneously when we are not otherwise engaged or when, for instance, we meet a friend. [Test.]

The bulk of our thought, then, apart from the business of life and our more or less permanent interests, revolves naturally around the casual events of the hour. [Does it?] This time-table of thought is not without its advantages, for to examine an object in all its bearings is only possible when we have it before us in something like its entirety. Hence it is best studied when re-development is practically complete. To put off our investigation to some future time is dangerous, since we shall find our memory to have shrunk surprisingly. We can, therefore, best whet our intellectual tusks by an analysis of the present. Subject after subject, as it springs up, is in this way examined and disposed of, and what is precious is abstracted from its veins. If, in addition, we consider that permanent interests and dispositions are by the nature of their constancy fresh and active, we gather that the mass of thought groups itself round the immediate present, and that the past and the future only enter as occasional visitors. In this wise our needs, in fulfilling themselves, follow the lines of least resistance.* The omnipresence of neural excitement and momentum seems, therefore, proved.

If we experiment, we receive confirmation of the above views. Allowing the memory to take care of itself, detail after detail appertaining to the immediate past is re-integrated, while that which is far off in time can only be re-produced, as a rule, by means of casual suggestions (sec. 152). If I watch my normal thought, I observe that while what has passed very recently is readily suggested by every topic and is frequently recurred to spontaneously, particular events in the far past, which have not been recently re-collected, lack both these characteristics almost absolutely. Everybody can test the truth of these statements for himself. To prevent prejudice he may also experiment with the purpose of showing that recent occurrences and recent memories do not possess the powers here assigned to them and that far-off ones do.

To sum up, one aspect of every combination is a mood or a neural excitement, and as such it persists for some time after its inciting stimuli are removed and is accompanied by appropriate thoughts and actions.
Uttering "Let me see," with the purpose of repeating the three words directly afterwards, I re-develop the brief phrase unfailingly, and I am convinced that I have re-collected rightly. It is not so when a day, a week or a month have elapsed. The curve of re-development inevitably dies, though its descent is gradual.

Prof. Lloyd Morgan (Conscious & Psyche, 1894, p. 73) pertinently marks "We may try to re-establish the sequence of words, or seven times fifteen seconds in small boys' minds, so that at the end of the lesson they once again suggest stimuli, the multiplication table runs smoothly. But next week, r, unfortunately, does not suggest stimuli, and the multiplication table becomes definitely lumpy. In learning a sentence by heart experimentally, I note that at first a few seconds intervene, the words are forgotten. Later, or if I can re-develop the sentence intelligently by making sensible efforts, word by word, and with heightened certainty that I am correct, a little less effort is required. The sentence is gradually and slowly re-collected, and I have more confidence in it. Carefulness at first may not occur. I am not saying it, although I am from doing so. With intervals of, say, three or four minutes, I repeat the sentence until I can re-develop it from memory. When I am able to divide activities, I shall not be able to concentrate. [Learn the following: y is constant.]

The use of this word, y is constant. It involves the idea of injury in the past and its present and future, and it always is true of the word in the present and future.]..."

We shall see how much is rememorable of one minute's thought immediately after the event (sec. 210), and we have learnt the quantity that can be remembered within a few hours (sec. 125). Selecting a somewhat eventful day [the student was at a hot place] and writing down the following day at 8 p.m. what I recollect of it, I find that the day had been selected after it had passed. I find that 750 items are re-integrated with ease. After a week I should normally be unable to press into service more than a few of these details; [As an exercise it should be varied.]

Reading a book on natural history, I notice that many unknown words are beginning to sound familiar. I merely re-member several scores of the definitions without frequently diluting to the book. I no sooner desire to re-develop them than the seeming with a bound into existence as if they had been expressly written for such recall. So unfailingly does re-development take place that, as I may, I find it impossible to believe that I shall ever forget the special nomenclature and definitions, and this in spite of the fact that I have on other occasions had the same feeling and yet lost every particle of what I considered a possession forged about my soul.

The book is read and done with, and it is put on one side. A day or two passes, and still I re-member apparently everything. A week runs its course, and there is some diminution in my accumulated stock, five or six weeks elapse, and I am only able to re-develop the general outlines of

"The records of memory, like trees and fungi, are subject to growth and decay." (Verdon, Forgetting, 1877, p. 441.)
the subject together with the more prominent landmarks. The notion of the permanent fulness of a large reservoir of knowledge, unaffected by the heat of other interests or the wind of oblivion has proved erroneous.

For a short period of a few weeks much may be re-developed. The specific gravity of a variety of substances, the specific heat of various bodies, the reaction times of psycho-physics, the mortality rates of towns, and a considerable assortment of other statistics, are taken to constitute a lasting fund of information when it is in reality only a temporary one. For weeks the figures are repeated daily, and yet, after ceasing to refer to them for a few months, our caged bird of knowledge has probably taken wings. [Deliberately learn sets of figures and letters, and watch the process of forgetting.]

For the average man to make sure that a topic will not slip away from him, he must remain on close terms with it for some months, perhaps some years. He must court occasions when he may revert to it. If he does not do so, he loses what he has laboriously acquired. Re-development does not depend only on re-institating a fact a stated number of times. The repetitions, for reasons which we shall learn below (sec. I34), must spread over a considerable period.

Of late I had occasion to learn a phonetic alphabet. In asking myself what is the equivalent character for b, the reply would come smartly, the reason being that while the question was evolving, the answer was already shaping itself. It was otherwise when I wished to write a whole word, such as "standard." Each letter took an appreciable time before it presented itself, and the result was thereby slowness. Practice must, therefore, proceed for a prolonged period, before the swiftness of re-development satisfies common wants. What is true of writing is true still of reading, as when a practised reader reads over 250 words in one minute. Nevertheless the meaning of a word, even with the expert, occupied sensible time. For example, travelling in a train, I vainly attempt to decipher the names of the stations as we rush through them; while in a railway journey by night the sparks from the engine appear as glowing wicks.

I32. - CRAMMING.

We can now understand the danger of cramming. Some weeks before an examination a pupil learns by heart a multitude of facts, words, statements and definitions. Such morsels of learning as are difficult to digest, he is made to assimilate temporarily by a liberal diet of stimulating examples. The day of judgment arrives, and he acquits himself honourably. His knowledge as well as his comprehension appear unexceptionable; his relatives and friends congratulate him; and yet, after a few slow months, one would hardly believe that Master X. had passed the ordeal. Learning never made a home for itself in his neurons. Cramming is hence indefensible. Were it not that examiners are fully alive to its pernicious effects, and model their papers on a plan which tends to defeat cramming, we should meet with little scholarship outside the examination room. The inspection of the learner's ordinary work is a well known safeguard against illusive progress.

* In 6½ hours I read a quantity of matter, equal to a rate of 189 words per minute.
There is another side to the subject. "Wherever the matter acquired is merely of temporary interest the power of casting off is a clear advantage" (Sully, Human Mind, 1892, i, p. 350). Jevons (Cram, 1877) examines the question in a somewhat heated manner, distinguishing good cram from bad cram, a legitimate distinction. Verdon says: "Our memories are like garden; and the richer they are the more they require weeding" (On Forgetfulness, 1877, p. 451). However, granting a well acting memory, and there is no reason why any acquisition should require weeding out.

114.—We forget Most Things.

Prof. Lloyd Morgan (Comparative Psychology, 1894, p. 73) concisely sums up individual differences in memory when he says: "Macaulay could not help re-membering; most of us cannot help forgetting.”* To retain to some extent an intellectual possession, months and years are necessary as a rule; but when we are once grounded in a subject it is easily re-developed and runs little risk of being consumed by the rust of time. Here are some extreme examples. Tasting a dish we were accustomed to twelve years ago and have not apparently touched since, we appear to be thrown back in time. Or we have been away from the country of our birth for ten years, and have not spoken many hundred words in our native tongue for most of that period. We seem unable to form a genuine sentence; but we return home, we hear the familiar tones, and, after a day or two's practice, we speak almost fluently. Or many years have passed since a man has been engaged in a certain occupation. He is compelled to return to it, and after a few weeks the fallow years seem but as days. The broad river of time is cleared in such cases at one bound. [The matter of this paragraph should be tested in the student, where possible.]

* For remarkable memories, see Biervetel, La Mémoire, 1902, pp. 52-6; Hamilton, Metaphysics, 1877, ii, pp. 224-6; and Henkel, Remarkable Cases of Memory, 1871.
†V. and C. Hemi, Premiers Souvenirs, 1896; Bourdon, Influence de l'Age sur la Mémoire Immédiate, 1894; and Colegrove, Individual Memories, 1899.
‡ I omit in my conception of "re-collections" such knowledge as is implied in the words and phrases I learnt, and in the muscular and neural dexterity I acquired.
seven months, yields 700 details. A second tour, a year later, extending
to Austria, Italy, Switzerland and France, and lasting three months, yields
the same figure, 700.

Thus the first 20 years of my life bring about 3600 sheaves into the
garner of my memory; 20 to 25, which were years rich in varied oppor-
tunities, yield 2000 more; and another 9 years, less suggestive in their
history, probably 4000 more, omitting the last twelve months up to the
time of writing. This swells the number of floating re-collections between
0 and 34 to about 10,000, allowing for omissions. A somewhat Bohemian
life is thus numerically summed up in what may be lived through in half-
a-day. In other words, I am able to re-develop about one 10,000th
of what happened to me, though it must be admitted that a quantita-
tive statement is not wholly satisfactory. Moreover, the re-developed systems
of the first nine years do not cover more than the space of a minute’s
activity, and could be re-developed during that short interval; and if we
apportion ten hours of waking existence to a day, I do not produce one
250,000th part of what happened to me during the above-mentioned period.
The facts on which the calculations are based, I may mention, were
carefully collected, sifted and tested. The records for the first 25 years do
not depend on averages of any kind, but on lists drawn up systematically
and supplemented by the occasional additions of at first unrecorded facts.

Let me give an illustration as to my meaning of point or detail. When at Torquay I
went (1) to Tottness (2) by rail; (3) I hope a glimpse of my arrival (4) and another of
part of my walk; (5) I see the pier; (6) we are going down the Dart by boat; (7) now
the river seems to become narrow; (8) now I see the hills; (9) the river is frequently
narrow; (10) I have pointed out to me (11) a barn (12) where some voters were forcibly
retained, (13) through which the borough lost its voting rights; (14) we see Raleigh’s
house, etc., etc. From this example it is plain that the number of details — since even the
simplest sensation is a complex — depends on not quite a satisfactory definition of what a
detail means, and that each inquirer must supply illustrations of his method. The mode of
numerical entry which I adopted was as follows. To represent 1 to 9 I used slight horizontal
strokes, and slight strokes slanting from right to left and left to right, three positions for
each stroke. In the tens I omitted the zeros. Each item was usually represented by one
word only; and, when practicable, as when re-collecting the shops in one road, I em-
ployed only the strokes without the word. In collecting my material I placed myself at
some chronological point, and followed closely every line of suggestion to the end, thus
covering a period as with a network. At the same time I kept notes of details which I
re-membered after completing the list. Ordinarily I also left a margin, from one to
twenty and more, according to the importance of the events in question. The student,
with these suggestions to assist him, should epitomise his own life, tracing the factors in
memory. He might also determine the proportion and nature of visual, audio and other
images, including feelings.

The relative quantity which an average individual re-members is paltry,
and only in very few instances — so few that they need scarcely be con-
sidered — is the far past capable of being re-instated without the assistance
of repeated memorising. This can be tested by every-day occurrences.
For example, I lose the manuscript of a chapter of this book. I am greatly
interested in its recovery; but for several months the mode of its disappear-
ance remains a mystery to me. Time and again I make efforts to remember where it was lost, and at last some one finds the manuscript. Do I even now re-collect the occasion? Not in the slightest. Again, I am about to re-read a certain play of Shakespeare's which, by the notes in the margins, I indirectly know I have read, and which I saw acted about six years ago. I carefully write down what I am able to re-develop of its contents: about a dozen details cover the ground. I now read the play, and observe that not a single additional detail is recovered. [Repeat the experiment.] It would be tedious to marshal further illustrations, and my observation of others agrees completely with what these two instances reveal. The mass of what is forgotten is irretrievably lost—no agonising want and no abnormal condition brings it back. There is also evidence to show that old men do not re-develop fresh details about their youth [ask aged persons what they re-member of their youth], and that in dreams, in delirium and in drowning it is unlikely that we re-produce what has not been re-developed for years—incautiously repeated tales notwithstanding. [Ask children about their earliest re-collections.]

It may be objected that, on my own showing, several thousand items are re-developed which date back many years. In these cases the memories are not as hoary with age as they appear to be. It is true that they refer to twenty or thirty years ago; but they have been re-integrated since at various times. Only in so far as systems pass through the mill of time repeatedly, do they survive long periods. For instance, a disastrous fire at a public resort calls up with me invariably a burnt-down theatre which I had seen, and thus alone is that sight preserved. Similarly with the totality of what is re-developed: as certain details are sensed, or thought about, so certain less recent ones are re-developed. Of course, some things are re-produced much more frequently than others, perhaps every two months, while others are re-developed not oftener than once in two years. A longer interval tends, I believe, to wipe out the traces altogether. Once, for instance, that a melody which interests us is heard, we repeat it frequently for a few weeks or months; then the intervals of re-collection gradually widen till reinstatement becomes difficult and at last impossible. If, on the other hand, a series of melodies interests us in succession, we dwell little on each, and melody after melody is rapidly forgotten. So with all our memories. They are first formed, then frequently rehearsed, then the intervals of rehearsal grow wider, then the images become indistinct, and at last they sink into oblivion.

Faces of old times, and distant events generally, are frequently, but unostentatiously, re-developed in connection with like faces and like events. For an example of these recollections see Galton, Inquiries, 1883, p. 193. For smell imagery, see Ribot, La Minutre Affective, 1894, pp. 379-81.

As we grow older, the earlier years lose more and more of their meaning, illustrative complications of old times being replaced by recent ones. Old notions and interests become obsolete and are forgotten, and new notions
and interests take the vacant places. Thus the bulk of memories con-
stantly shifts its centre of gravity, keeping close to the heels of the present.
Because of this device the memory contents present many anomalies, and
for this reason much which we re-develop is of less importance than much
which we forget. For instance, I hear a witty saying. If I am pre-
occupied, I forget it almost at once, while if interests are pressing, it tends
to be ignored. If, on the other hand, I have occasion to repeat it and re-
repeat it soon, then this witticism is retained and prevents the ready
assimilation of fresh ones. In this way accidental circumstances decide to
some considerable extent that unimportant matters shall be re-developed,
that others shall not be acquired, and that important ones shall be de-
developed or forgotten. For the same reason persons who live much in
the past and love detail will re-produce much, while those who live in the
present and abhor detail will re-produce little. So also in a monotonous
life little will be re-developed, since the later events displace the earlier,
while in an adventurous career details will be unlike and will, therefore,
not cover each other. Lastly, men interested in textual or historical studies
will re-member much.

It is difficult to determine the quantity of details re-developed from day
to day. [You might help in ascertaining the precise facts.] In the
twenty minutes’ conversation recorded (see 105), I re-member fifty-eight
terms which refer to the far past, the most distant being about eight years
old. Thus in a casual and typical chat I retell an incident, about seven
years old, containing forty details out of a possible ninety. Again, in
another talk, I refer to twenty-seven out of a possible forty-five details, at
least eight years old. Under similar circumstances I re-develop seventeen
details out of a possible twenty, at least four years old. I envisage that some
thing would fall, I re-develop a similar incident six years old, and then
another sixteen years old. Of course, on none of these occasions had I
any thought of experimenting. Watching other people, they appear to me
to re-develop systems at the same rate and in the same manner. Every
day about twenty details referring to the more distant past are perhaps re-
reasserted. Is this so? Few days pass without some old systems re-de-
veloping, while on favourable occasions several hundreds of these are
re-manufactured. To take an extreme instance, one day I recorded in my
note book one thousand items which I deliberately re-developed.

It is plain, therefore, that the total of details which may be re-developed
is not the same as the total of details which we have lived through, and I
surmise that, with trifling exceptions, our collections do not go back directly
more than about two years.* [This is a guess.] It is also obvious (sec. 96)
that methods of work and thought, as well as much of our general knowledge, are
over and over again applied within the year, thousands of them being repeated
day by day.

There is no princely path by which we can return the way we have

* * “The pictures drawn in our minds are laid in fading colours; and if not sometimes
refreshed, vanish and disappear.” (Locke, Human Understanding, bk. 2, ch. 10, sec. 5)
come. Where there were stately cities and the hum of busy life we encounter ruins and a scarcely broken silence,* for only what perennially enters into our daily task and our homely thought is guarded against the wasting influences of time. Facts and fancies come to us thick as snowflakes. Most of these fall on uncongenial soil, and are no more; some of them lie on the ground for hours or days; nearly all are gone with the season; and a few only remain on the mountain tops. As a knight's shining armour, to put the matter differently, requires constant refurbishing, so we are compelled continually to relearn as well as to re-develop. The majestic mountain masses and passes of Switzerland, the images of which lovingly lingered for years, are paling gradually but surely. The memories of the Capitol, St. Peter's, the Pitti Gallery, where they are not replaced by the images of photographs and pictures of those places, are lost in the haziness distance. The corridors of the Louvre, the Rue de Rivoli, the Avenue de l'Opéra, are fancies rather than facts now. Influences which promised never to abandon us, are growing dim and distant. Hence we have to re-read our books every lustre if we have not outgrown them, and our beliefs must be re-examined if our faith in them is to have a reasonable foundation. A large portion of our life is thus given to fixing and refining the shadows of things.†


There are a number of factors which conduce to obliviscence or dismemberment. The first in order is superficial primary attention (sec. 116.), and here it could easily be proved that we membered in the first instance, though we are unable to re-develop what we had membered. [Prove.] Next comes attention at the margin (sec. 116.), as in marginal sight, and here again a thing is no sooner observed than it is forgotten. [Test.] A similar factor induces forgetfulness in secondary attention. This happens when we are only interested in the most general features of an image. Under these circumstances, and they are most common, less and less of the image is re-developed until the barest outline remains. [Examine experimentally.] Over and above these attention aspects, comes the fact of simple forgetting or re-development. For instance, I look at the underside of the seat of some particular chair, carefully and at leisure, and enter in my notebook what I have observed. After twenty-two days it occurs to me to test my memory as regards the chair. For half-an-hour I try to re-produce the appropriate image as completely as possible, and I find that insistence does assist. I then enter into my notebook the result of my reflections. When, for purposes of comparison, I look at the notes containing the first set of observations, I am unable to re-member anything more, though I strain hard for some minutes. Lastly, I view the propped chair carefully once

* "Time mutilates our memories. Like names written on the bark of a tree, they have become distorted by change of years." (Verdon, Forgetfulness, 1877, p. 447).
† Galton (Inquiries, 1883, pp. 185-203) has a short discussion which bears on the subject of this section.
more. To my surprise I discover that my image is very incomplete as well as misleading, and it further transpires that what I observe is wholly unfamiliar. \[\text{Experiment collectively with physiological and other diagrams.}\]

In such an experiment, then, it is made clear that lapse of time of itself mutilates and ultimately kills memory. \(^*\) Hence, if we grant that memory is ever fading, we can understand the importance of recurring to a subject, or, as with the very young child, the significance of ceaseless repetition of every kind of activity.

From the last chapter we know that, roughly speaking, images develop out of other images or sensations, and that spontaneous images, apart from neural excitement, are practically unknown (secs. 90-2). At the same time development has its limitations. For example, the letter a being connected with the other letters of the alphabet, and these in turn with primary and secondary systems of every class, we might imagine that the letter a would tend to develop the whole of what we know. This is so far from being the fact that the letter a will generally suggest nothing. To be able to redevelop a fact which we are observing there must be close intimacy between it and some known fact; for when an observed fact is not related to anything established, there will be no obvious means of recalling it, and it will, therefore, tend to be forgotten. On this account it is well so to connect all that is worth re-developing that it may be developed pretty frequently, and since systems are seldom carefully connected with this end in view, most things are naturally forgotten. Furthermore, disintegration being a constant factor, it follows that what is little attended to becomes indistinct, and for that very reason it is neglected, dismissed and forgotten. Lastly, change of interest, largely due to periodic needs and the rivalry of primary systems, further weakens and destroys the traces of the past until there remains only a small residue of typical and firmly connected units of thought and action.

116.—Re-Development is Attention to Surviving Traces.

In section 108, and again in section 109, I referred to the immediate constituents of primary and secondary systems. This, of course, includes what is redeveloped. Let us pursue the theme a little further. Some one is an excellent mimic. I have reason to believe that he is a good visual and auditory—one who well images sights and sounds. I ask him, “Do you re-member the hearth in A’s study?” “Perfectly,” he replies, “I see it before me as if I stood in front of it.” His eyes appear meintime rivetted on some uncanny object. “Can you tell me?” I then continue, “the number of circles round the marble rosettes?” He is non-plussed, and that because there are limits to second sight. \[\text{Test yourself and others in this respect.}\] It is astonishing how much some people observe and re-figure; but though a man can re-member much, he soon breaks

\(^*\) An experimental study of this subject is found in Philippe, \textit{Sur les Transformations de nos Images Mentales;} 1897.
down under a close examination. If we consider that to observe is to attend, we shall see how absurd it is to expect flawless observation by means of re-collection. If an object as such were presented to a consciousness, this would be probable because the object would be in consciousness. Not so on the theory of attention. When we look at an object, there is a constant flow of fresh images, for new systems are persistently being developed. Memory is re-development, and a full complement of images of an object would imply that we have exhausted the possibilities of observation.

There is another aspect of the above problem. I show to a friend a good visualiser—a striking cartoon. He just glances at the sketch before I remove it, and I then put to him a number of questions as to the details he has observed. It is surprising how often he is right, and it is instructive to notice how often he is wrong. He has three buttons where there is one. He describes the character's boots, whereas in the cartoon they are covered with a rug. Positive error thus enters into his image. [Extract]

The last statement provokes a question. If I changed the picture to suit his description and showed it to him, what would he say? For my own part I have little doubt as to how the query would be met. Judging from general observation, I conclude that he would reply: This picture is different from the one you first showed me. He would find that the secondary combinations led to absurd images, and that when they were brought together they eluded each other. He would also on seeing the first sketch, re-member its details more clearly [Test this]. They would have an intimacy, compared with that referred to in the example of looking over a little volume we have just finished reading (sec. 108). He can often identify to a nicety ax. rect. when face to face with it, while free reproduction is yet denied to us. In other words, recognition is superior to free re-development.

117—No Detailed Image in the Memory.

The description of the image, in the case of the cartoon, is rejected in favour of the actual delineation. Was there then no fixed image or counterpart of the object? The next section answers our question in the negative. Observation is essentially organised. It is as far removed as possible from resembling the ordinary process of photography. Not only do we in practice chiefly see what we have seen before; but the whole attitude of observation is utilitarian. We are arrested for a moment by one or two attractive features. We do not fix an object with our eye camera, we walk around it. We do not take the whole of a scene in at once, but in a rambling fashion we observe a few details often and many details not at all, slurring over some, and dwelling upon others. The eye product, leaving aside after-images (sec. 125), is, therefore, substantially different from a photograph. Except with systems which we have developed repeatedly, and with such as we have just developed, images rich
in detail do not exist normally. [Have you detailed images?] There is usually present a summary feeling conveying the total impression, and a number of more or less hazy and scrappy images.

Lotze (d. 1881) (Microcosmus, tr., 1885, i, pp. 326, ff.) holds that memory implies too complex a process to be accounted for neurally. He says that an object differs so much with the closeness and the position of the spectator that the corresponding image would, but for spiritual activity, be a mass of confusion. Wundt's explanation of Lotze's difficulty is of the composite photograph type. He writes: "If we think of an acquaintance, we never image him precisely as we saw him at a certain moment; our idea, on the contrary, is composed of many observations the constituents of which partly complete and partly dislodge each other" (Bemerkungen zur Assoziationslehre, 1891, p. 339).

The subject is one eminently fitted for experimental observation, and I have, accordingly, gone somewhat carefully into the matter. Testing the memory contents by the rule of objectivity (sec. 136), I find that the images of acquaintances are with me individual and not superimposed (sec. 76a). A particular re-developed system, or several particular ones, stand for the man or the woman. I cannot find any image which resembles a composite photograph or which is not individualised. Experiment confirms this. I have specially observed a multiplicity of objects both stationary and in motion; some once, some repeatedly; some for a long time together, others for fractions of a second. The images never fused, though I often desired them to do so. Most of them could be re-developed for a second or two; but they were soon forgotten. Changing objects, such as trees which I approached, offered several particular images, according to the transformations which I noted; exceptionally I could image the object as changing. There was neither a composite image nor a supra-mundane one. One minute's continuous observation could not be re-instated, owing to rapid oblivion. Some favoured snapshots survived, and those were the ones which went to swell the entries in my memory. However many deliberate experiments I made, the result remained the same. I claim, therefore, that Lotze and Wundt, and those who agree with them, are wrong as far as my memory is concerned. The only fact to be explained is why the second snapshot is more easily taken and preserved than the first. [Diligently study your stored images, the creation of images, and the growth of typical images, as far as ol. the senses are concerned.]

If we turn to a related class of facts, those of summary feelings and combination feelings, we come to a different conclusion. For instance, in reading a book, my opinion of it seemingly grows or changes as I read. So with the impression left on us by a visit in the country. Objects have thus a constant influence on us, leaving traces which in a remote way resemble composite photographs. However, this holds only of feelings.

118.---Images are soon Exhausted.

An image scarcely arrives but it is gone, developing and disappearing within less than a second. [Test.] This might be explained, and, to a certain extent rightly, by saying that we dwell organically on images for a very short time. We have speedily dismissed, pre-developed and re-developed pictures millions of times [is this so?] it is argued, and, therefore, we are now unable to keep them before us. A different explanation appears more satisfactory. In studying, for instance, one of Raphael's Madonnas, there evolves a comprehensive summary feeling like the moods we have spoken of in sec. 109. I did not study the picture down to its minutest details; I was interested only in a general way. The attention given to sundry aspects differed, and I know the picture consequently as a whole rather than in its parts. When I stand before it, my attention is employed in
rapidly and tentatively sweeping over various portions, and these are not fixed in my conception. In re-development, then, what happens is this: the outlines are vaguely re-instated, and along with these, or preceding or succeeding them, is the persisting feeling which evolved on the occasion when we took our many observations. This mood tells us, or can be made to tell us, how we were affected in the first instance. Fitfully one minor feeling relieves another, and these suggest the contents, or often they only hint at them. The crude and incomplete sets of outlines, indicative of the reality, hover about. Beyond details here and there I observed little, as my eyes, like search-lights, swept rapidly hither and thither. Hence attention,—at least in those who have not made a special study of that Madonna,—when directed towards this image, finds almost nothing to do, and seeks for pastures new. [Test experimentally.]

The incompleteness and waywardness of the attention chiefly account for the imperfection of the re-produced system. Let us apply this explanation to facts which are easily verified. Looking at a tree in winter we observe manifold branches and twigs. The whole appearance is like that of a gigantic coral. Could any one, I ask, re-integrate such a tree so completely that he could forthwith start counting the leafless boughs one by one, as he might in a perfect after image? Most assuredly not. He has only scrutinised the tree superficially; he has guessed rather than observed; he has only scanned some of its outlines and its general appearance; and he has gazed more or less inattentively and intermittently now at this detail and now at that. There was not one view; but there were various views, each incomplete.

Walking along a country lane, I notice the grasses which line both sides. What man could count the green blades and measure their length by developing the image of the country lane? This last case throws light on the question of what a casual observer re-collects of the Madonna. Suppose the whole figure covered with type such as that in which this book is printed. Could the observer at a glance read the whole type off the picture? Now the letters only give coarseness to the multiplicity of details of which the picture is made up; for just as the type yields a blur in the image, so the average view will, except for general outlines and special details, be a blur. Correct observation is the art of the specialist, and as a class of objects is more and more exhaustively attended to by us; as discrimination deals with more and more details; as innumerable details become well connected, so observation yields increasingly higher results. For this reason a breeder of horses recognises or connects a quantity of details where the non-specialist hardly sees any. Similarly, the lady of fashion, after a single set of observations lasting a second or two, can give a surprisingly detailed account of her rival's dress. So also the captain on a stormy sea quickly takes in the situation. In these cases recognition, being easy, proceeds generally apace. Speaking broadly, we only see a thing so far as it is known; so far as it is not known it is not seen, but represents a blur and is speedily forgotten. [Observe a large number of objects with the purpose
of testing the above.] This confirms what we learnt in sec. 44 as to the superiority of systematic re-attention.

Experiment strengthens our conclusions. My eyes, in passing, catch one imperfect glimpse of some gold chains in a shop window, and as I continue my walk I say to myself, "That is a jeweller's shop." The general impression being one well assimilated, I do not trouble about a multitude of details. My attention fastens on a few trivialities, and everything else is left to be inferred. So also in the many individuals, vehicles and houses which challenge my interest. I member this or that semi-familiar detail, and ignore or conjecture the rest. In this way I recognise a whole street at a glance, observing very little as regards detail. In half-an-hour's walk my eyes alight on several thousand objects, just noticing them or selecting some peculiar feature. I hear a familiar person's tread, or catch a side glance of his coat tail, and that satisfies me as well, as regards his identity, as if I turned round and eyed him minutely. Again, my eyes pass by the object on the table which they are in search of. [Test the above account.]

Observation, then, is not mechanical, but need-determined (sec. 78), and two-thirds of a second is the average time spent in the contemplation of an object. This can be thoroughly tested by examining a fine photographic view. On repeatedly inspecting it, we unmistakably note that all is not revealed to us at once, and that it is only occasionally in ordinary life that we are detained for several seconds by any scene or object. [Examine a good photograph.] In frequent observations the same features, unfortunately, attract us. [Test this.] When, therefore, an average image is developed, it continues to exist only for a moment. It is otherwise when we have made a special study of an object. The man whom I have observed repeatedly, with a view to gathering a large number of details, can be re-developed for a considerable period. [Test this.] Minute observation, however, is rare, and the majority of images, therefore, no sooner develop than they de-develop.

119.—Visuals, Audiles, Motiles, Emotiles and Mentals.

This brings us to the consideration of a subject which has been much discussed. In some individuals visual images are developed with ease; in others auditory ones; and so on. In the language we have adopted we assert that in re-development attention is expended in proportion to the possible completeness of the re-production. We also infer that the strong visual is one who in the first instance attends efficiently, and that the observer who stocks no details, can never be an expert visual.

* "Suppose that in the course of a few minutes we take half a dozen glances at a strange and curious flower. We have not as many complex presentation which we might symbolise, as P, P, P, etc., but rather at first only the general outline is noted, next the disposition of petals, stamens, etc., then the attachment of the anthers, form of the ovary, and so on." (Ward, Psychology, 1886, p. 47, col. 1). It must be added, however, that when interest and training are absent, repeated observation frequently refers only to what has been already observed. The ordinary man, in this respect, views the world as from a round-about or a rocking horse. He is unlike travellers who eagerly penetrate jungles, climb mountain-peaks, and cross deserts and seas.
Owing to this divergence in individuals, certain facts become obscured. Suppose I re-develop an incident. If I am a visual, I see the scene; if an audile, I hear what happened; and if a motile, I re-enact the event. [Are you a visual, an audile or a motile?] There are many persons, of course, who possess the characteristics of all these types. To take an illustration, I narrate to a child of four the story of "The Boy and the Wolf." When I have finished, he begs me to tell him the tale again. I do so. He asks me to repeat it once more, but I decline. He then starts telling me the story. By his strange gaze, the curious sound of his words, and his gestures, he betrays that everything is enacting itself within him. He seems to see the boy, the wolf and the sheep; to hear their voices; and to move with them. He tells the story so well, so vividly, that I feel ashamed of the baldness of my own narrative. Memory is, therefore, sometimes strongly realistic in several departments of thought, though the degree of realism varies with circumstance, with the individual and with age.

Some image nearly everything in terms of sight alone; others re-produce the living reality—the sight, sound and motion combined. There is another method of re-collection within these. Some persons are able, as it suits them, to image an object now in terms of sight and now in terms of some other sense, and such persons have been styled Indifferents. For example, in re-integrating a melody I have heard sung, I sing it to myself, or I merely listen. In the first instance, the larynx will be affected: but not so in the second instance. For this reason I can hum one tune while listening to another, or I am speaking while at the same time I am reading by the application of pure sight. I trill r's rapidly while thinking in words; I combine sounds of every type while reading or listening imaginatively, and I see one object before me while imaging another. Hence in re-developing a duel which I witnessed, or in which I was one of the combatants, there need be no movements re-enacted and no sounds heard. I picture the sight alone. For the rest, nothing can be concluded as to the presence of a factor in average cases from what is done by persons under excitement, by infants or by old men. [Test this paragraph step by step.]

Bain (Senses and Intellect, 1894, p. 417) expresses a prevalent view, the truth of which has yet to be proved, when he affirms that an idea is "a past experience, revived on the same nervous tracks" and that "the renewed feeling occupies the very same parts, and in the same manner, as the original feeling, and no other parts, nor in any other assignable manner" (ibid., p. 356). So Spencer, Psychology, 1890, 1: "To remember a motion just made with the arm, is to have a feeble repetition of those internal states which accompanied the motion—is to have an incipient excitement of those nerves which were strongly excited during the motion" (p. 448); and what "we call idea, are nothing else than weak repetitions of the psychical states caused by actual impressions and motions" (p. 456). This view in itself does not settle the question whether we re-instate the visual or the motile aspect of an event, unless we assume that all memories, except as to degree, are faithful and complete copies of primary occurrences. A graver problem is involved when we sense one thing and image another at the same time. In such cases we have evidently two visual fields, while off Bain's theory, the sensory field should apparently extirde the imaged one and vice versa. I have made repeated experiments to assure myself that I am actually employed in seeing while a scene is re-developed, and
the result was strongly confirmed the simultaneous double view. [Experiment in the box] As regards this matter Baner reasons, somewhat judiciously, that some people remain excited when excited tend to act out their thoughts, therefore they do so when they are excited. He makes no attempt to settle the question by experiment or by direct intensive observation. Of the experiments mentioned in the text, there is one which is very difficult. It is only rarely that I can hum one tune while listening to another, even when, from a musical box. The greatest feat for me would be to recall two tunes at once, or to listen simultaneously to two conversations. It will be understood, of course, that it is easy to hear sounds while humming, but that it is difficult to weave them into a melody. See also Binet, 'Image Consciente et le Sens Imitatif,' 1883, and Lec (Sensation et Vous mentez, 1887, p. 16), who asserts that the actual movement is the movement already in the

I have referred to visual, audible, and motile, but no limit should be drawn to these types of minds. We can, for instance, construct an emotive class. In this category would be placed those in whom by preference the emotional accompaniments of my event were redeveloped. They would recall them in terms of emotion. All that was felt, the emotive would conscientiously reconstruct, but what was not emotional they would apprehend, like one who is short-sighted, indistinctly. One can, with advantage, suggest and limit class difference of type at mind. They are only of feelings which indicate the development of happenings, and which have been already referred to as summing feelings and combinations.
will, however, discourage such a conclusion. Let me endeavou by to redevelop smells or tastes, and he will most probably find himself built
[Experiment.] This being the case, we must ascertain with some exactness what, and to what extent, primary systems are normally redeveloped.

In the first place we note that children are generally strong visually—whatever else they may be, while with adults, visual imagery also takes the most prominent place. [Experiment.] Owing both to education and to congenial disposition there are undoubtedly considerable differences in visualizing capacity, but these do not affect the main

Next in order to sight, comes hearing. As we shall learn from section b, there is little agreement concerning the auditory memory. For my part I cannot help feeling that I can remember the voices of friends although I find it difficult to hear them as much as I also appear to discern in memory all the degrees from a whisper to a loud sound. Moreover, my sound memory extends to all kinds of sounds, including many which I cannot in an, why must I As with sight, so with sound. Sounds of my kind that have been but just heard can be redeveloped with considerable ease, fulness and accuracy. [Experiment]

When we come to smell systems, we find that many persons at last cannot develop them. In my case, with little smell memory I appear to have, consists probably of an impression of the effect of various smell upon me, together with sight nasal activity. Neither in dream-like nor in imagination have I smelt unless a substance having smell was present. At the same time, the recency of the actual smelling, excluding particle well lodged in the nostril, does not last smell moves. [Experiment as both recognition and recall]

What is true of smell is true of sight. Within my observation I have never caught myself tasting in him, in imagination taste, then, so also most likely (and not only) from the secondary retina.

To complete the crude orthodoxy classification, we have to add a word as to redeveloped touch systems. As regards these latter, it seems probable that they are not redeveloped as smells and tastes. Other sensations, such as those of tension of the muscles, of general sensibility, are equally difficult to remember and it accords with this that the remembrance of pressure may be smell out of the question.

However, whether or not the items of sensations appear in a secondary form, summary fashions and combination feelings share with sight and sound the honour of occupying the secondary plane. Mere sight images, apart from an aura of feeling, have scarcely a place in the memory. We may note also that summary feelings, in comparison with other sensations,

*Zwanziger, Der Umfang des Gehors in den verschiedenen Lebensjahre, 1893.
2Zwarinism, Die Physiologie des Geruchs, 1895; and Pann, Recherches sur les Sensations Olfactives, 1895.
3Know, J. W. S., der physiologische Psychologie des Geschmackses, 1893, 6
4Pfner (Epomeni, 1860, II) says that he can only remember colours connected with striking objects, and then only doubtfully and hazily (p. 470). His wife could only remember tastes and smells (p. 482).
[Thoughts on Colour, Sounds, Tastes, etc.]

Naturally the question uppermost at this point must be why certain senses are more developed than others. Sounds, unlike sight, offer no continuous plane, and why sight is the most favourite sense with the secondary plane, and why sight is the most favoured.

The two eyes can only see up to a certain distance, and the movement of the eye and normal vision, is limited to a certain extent.

The sense of touch also requires movements of the body to be observed, and it can only be somewhat slow and deliberate.

The sense of balance is also required for the perception of balance, and is highly sensitive.

[Reduction to one dimension]

The more complex movement of the eye, which is not only the result of the coordination of the eyes, but also the result of the movement of the body, is limited by the movement of the body, and is therefore not as complex as the movement of the eye.

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to two dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to three dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to four dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to five dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to six dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to seven dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to eight dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to nine dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to ten dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to eleven dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to twelve dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to thirteen dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to fourteen dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to fifteen dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.

[Reduction to sixteen dimensions]

The motion of the eye is limited by the movement of the body, and the movement of the body is limited by the movement of the body. This is a fundamental limitation of the sense of balance, which is therefore less complex than the sense of vision.
sense of sight should play the leading part on the memory stage. Again, the mobility we have spoken of touches secondary as well as primary systems. Not only does movement exist in pre-memory, but it shows itself in remembering, though to a slighter extent. The exact division on this point is still lacking. What seems to happen is that only the initial steps in every movement are repeated. Thus instead of the eyes, in secondary vision, boldly moving to right or to left, there is, on this hypothesis, only the strain or impulse which goes with the inception of the movement. Hence the secondary sweep of the eye resembles the primary sweep in every detail, except completeness. The movements being essentially alike in both sweeps, we have essentially the same results.* It is in the fact of independent mobility that we shall probably find the explanation of our being chiefly visual in regard to the secondary realm, and it is this which explains the pre-eminence of binocular memory, since here there is available, besides the number, the highly mobile lingual apparatus. Since in smell and taste, in touch, independent mobility is so small, sense congenital would only be repeated in those directions to a minimal degree; if at all, and hence there would be but minimal memory as regards these senses. We are prone to pleasure pain the mouth, fairly clear processes in the sense of a general disturbance or shock, it will only be perceptible redeveloped when there is a general disturbance, under the influence of excitement. Reviewing this intricate aspect of the question, the conclusion seems warranted that the difficulty of redeveloping a function, together with the high state of development of that function from the point of view of attention, are the factors which determine the fulness of memory. [How is the case of].

When we come to the limps of don't and wisdom, hope and despair, emphasis and doubt, to limbs which blend thought with warmth and its life, we are tempted to deny that these limbs have secondary characteristics at all. We may be in need of all them mere repetitions of feelings which were formerly left. We might argue that a man's eyes and features speak eloquently of his [limbs] when he is absorbed in memories, and that, therefore, we have present in such case redeveloped limbs and not re-developed ones. We might further insist that these limbs, as revealed by introspection, have a purely primary character, and suggest nothing secondary.

In a sense, the view just put forward is correct. The truth appears to be that the matter of primary and that of secondary systems is strictly one. The limbs, accordingly, as well as the sensations, always remain the same whether it be a question of pre-developing or re-developing. Thus visual and aural systems of a secondary order differ in no substantial respect from visual and aural systems of a primary order. In

* Fergus (Functions of the Brain, 1886, p. 463) says: “When we think of a large or distant object the eyes are divergent or parallel; when we think of a small or near object the optics converge.” [Test with mirror.]
memory we have merely repetition. Where influences beyond the body are concerned, as in sight or hearing, certain parts of the action fail to be repeated; whilst in the case of feelings or organic sensations the repetition may be complete. Hence primary and secondary systems offer the same matter to inspection, and only the setting or the environment is changed; and this conclusion again confirms our belief that the motor activity implied in primary systems recurs in secondary systems.

The question thus arises whether there is any essential difference between thought and action. Taking a normal instance, this seems to favour the existence of such a difference; but we may choose examples which introduce considerable doubt. For instance, resting in the tall grass by the roadside, I hear some one approach. Though he is alone, he is speaking aloud and gesticulating freely, as if he were engaged in an exciting conversation. Assuming now for the moment that this individual cannot image sights, and we have a man, the matter of whose thought in no way differs from primary activity of a normal character. Thought, in this case, is "acting," in the actor's sense; though the "actor" is here an extempore playwright also. Such thought is indistinguishable from the actions of an engineer who, with his hands, is thinking out some piece of work. Other instances illustrate the same point. We may sing aloud a song that we know, or recite aloud a favourite poem, or quote to some one a remark we had made on a previous occasion. In these cases what is remembered is pre-membered, and, as far as the "matter" of thought and action is concerned, no difference is discernible. As I am writing now, I audibly whisper the words to be written. Here the voice is merely lowered in the process of thinking. However, this lowering may continue, until I alone can hear myself; and, further, the movements of throat, tongue, teeth and lips which are so frequently observed and so difficult to avoid, may apparently disappear in thought speech. All that we note, then, in normal thought processes, is a very low degree and restricted range of activity. A microphone might, for this reason, betray our innermost word thoughts, and our whole "inner" world will perhaps one day be open to others. Those who do not accept such conclusions must point out the essential difference between loud and silent soliloquising.

If we once admit that the matter of thought and action is at best only distinguishable in degree, we may further determine the precise meaning of the degree. Seeing that speech may be loud or soft, and accompanied or unaccompanied by gesticulation, we learn that thought may be simplified along two lines. The sensation or pre-integral may be reduced to its simplest form, e.g., a grey outline may take the place of the coloured complex; and, secondly, thought, as was remarked in the last section, may only repeat the visual, the audible or some other single aspect. That simplification will normally take place, is evident from two considerations. It is inconvenient to one self and to others to utter one's thoughts aloud or to gesticulate; and it is also against the nature of the need-determined attention process which we have dwelt upon in ch. 2, to elaborate anything