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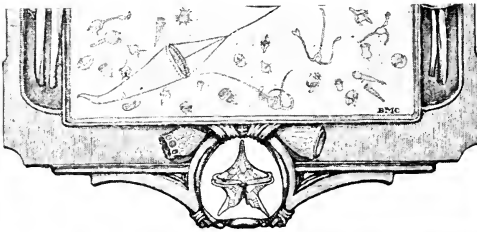
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REMARKS ON  
IMPULSES  
CEREBRAL AND SPINAL.

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BY  
PROFESSOR RICHARD JOHN ANDERSON.

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*Richard J. Anderson*



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# Remarks on Impulses, Cerebral and Spinal.

By PROFESSOR RICHARD J. ANDERSON, M.D.

The great importance of stimuli is seen in the life (in both health and disease alike), and in the development of the individual, and in the existence of a nation. The influence of suggestion is well known to be great as regards mental activity, whilst it seems to have played a very important part on, and in, the course of historical events, where large bodies of men appear as active factors. Command, precept, and example are usually regarded as the most potent methods of conveying suggestion. There are, however, means of suggestion, chiefly auto-suggestion, that are sometimes very potent. [ Johnson, on one occasion in Westminster Abbey, said to Goldsmith as they stood looking at the memorial tablets of the poets, " Forsitan et nostrum nomen miscebitur istis." A short time after this Goldsmith and Johnson were at Temple Bar where the heads of some decapitated criminals were conspicuous above the Bar, Goldsmith, turning to Johnson, said " Forsitan et nostrum nomen miscebitur istis." ] Examples meet us daily, and amongst these are those that have different results for different people. The channels through which they act may at first be intricate, but may afterwards be less complex owing to repetition, and indeed may, after a time, be transmitted direct to the centre of reflex, and end in a simple reflex action. Stimuli, that effect what are called, somewhat indefinitely, the main springs of action, are apt to be the most potent. Interest, pleasure, and glory are the three motives of the actions and the conduct of men.

"The inhabitants of Gadira honoured poverty with a peculiar veneration ; they regarded it as the mother of industry and the arts." A similar suggestion led, no doubt, to the phrase " Necessity is the mother of invention," and " Who makes the

fairest show means most deceit." "How quickly Nature falls into revolt when gold is her object" seems to refer to the altruistic side of Nature's character. John Hunter expresses his opinion of the above characteristic of Nature when he said "Nature will kill the man if she is let alone"; he did not mean the Nature whose "benignant flowers within her virgin bosom wrought." "Danger is the soldier's duty, and his prize is fame and beauty." "Maidens with their haughty glances, these the soldier seeks with ardour." This refers to the combination of acquisitiveness and altruism.

The efferent results may be very complex, one set of muscles succeeding another in action, but the result may be like simple reflex, as when the odour or sight of food produces salivation. The impression made through a sense organ may be slight, the result may be far and wide reaching. But the reproduction of the stimuli evolves in animals the original sensation or movement. The stimulus may appear absurdly small, as a touch causes *Mimosa pudica* to droop. A patch of white may set a dog barking at an approaching figure. The introduction of a hand into the pocket may make a dog wag his tail. A rustling paper may make a horse kick frantically, or a measured equine tread cause a horse to prick up his ears. The operation may begin by being psychic, but commonly develops physiological features. The somnolent dog repeats the bark (somewhat smothered) of the pacing dog. If the suggestion through the organs of sense gives rise to sensations of pleasure or pain, or a train of thought, without evoking muscular movement, one may place the results in the category of circumscribed activities; this may be of social importance, or may come within the range of the social suggestion of Von Bechterew.

It seems clear, however, that only a narrow tract of borderland separates the central from the circumferential, however we may take it. Darwin seems to have had no difficulty in identifying the psychic with the physiological. The physiological may be lost in the psychic, but the psychic may be followed by the physiological. In that case the aesthetic or psychic takes the place, or is made to take the place, of the more complicated series of operations. The "fetch and carry" may mean food for the dog as the big loaf may mean a cheap meal for a poor man. The original stimulus is physiological here. The final is reflex in result or psychic or aesthetic.

The simplest accidental character may in time, for animals

generally, reproduce the sensation or action. In children of early age the simplest accident, if repeated, may reproduce likewise the sensation or action. For example, a child imitated the action of smoking with its lips, on seeing a smoker whose appearance was familiar. A child, on seeing a simple linear figure of a man, may say, when asked what it is, "it is father," or "it is mother." The humourist tells the story of a child who, on seeing a monkey, called out with outstretched arms, "Pa!" The recognition in the child is suggested by a more complex figure in the above examples than recognition is in animals. It is well known, however, that a trivial sound or sight often suffices to suggest the approach of a familiar friend to even an adult of mature mind. The sense of smell counts for much in mammals, so it is very difficult to tell how much they depend on sight alone. Their general notion of a man seems imperfect or absent. The general notion must be somewhat shadowy for the average man, and even more so for the scientist. The term quadruped is for some reduced to a flimsy, shadowy impression, limited by a pallisade of words. For the young child the term quadruped is apt to arouse a vivid image of some actual animal of the four-footed kind. The operation of suggestion may be mingled with association, and association partakes of the nature of a sequence, one act suggesting the next, so that a chain of events may result. It is evident that the anatomical juxtaposition of the centres of action may suggest a sequence, as happens in the brain, or the action of one muscle may set off another. It seems from Sherrington's observations that the bending of the knee causes, by stretching the extensor muscle of the knee, a reflex inhibition of the contraction of that muscle, the muscle assumes, therefore, in consequence, a greater length. The afferent nerve is concerned in this. So a transient contraction may be prolonged owing to the regulation of the reflex tonus by the afferent fibres. Similar suggestive reflexes occur in invertebrates (Von Uexküll in the *Sipunculus Retractor Muscle*). The contraction of a frog's gastrocnemius sets another muscle contracting, if the latter's nerve be placed on the first muscle. It is not unusual to find the nerve to a distant muscle going through a proximal one. Having got the sequence, it is comparatively easy, in training, to isolate one set of activities by rendering others unnecessary or nugatory. When dogs are taught to fetch and carry, by the hope of getting food, the exercise is, when established, an agreeable one; so after a time the habit becomes established;

no suggestion of food seems necessary then, and the fetching and carrying are done without even a kindly word or caress. Nor is anything necessary in some cases, except the throwing or pointing out the stick. The word need not be accurately said; an approximate sound answers as well as the real word or sound, just as a clipped word serves in man. It sometimes happens that a stick becomes so suggestive that the sight of one develops in the dog an intense desire to bring or carry it to somebody. It is said that in use of suggestions as between persons, that some psychical relationships should have previously existed between them. Thus people brought up in the same family, by the same instructors, and following similar lines of thought, are more susceptible in the case of special suggestions. Suggestion, unobserved by one, may strike deep root in the case of some other person. Again correlative suggestion may be much in evidence in some cases. An imperfectly uttered word may be understood in a different sense by different people. The following may be noted. A lecturer urged the importance of subscribing to a local charity, and said pointedly that money in such cases was a *sine qua non*. The sentence was reported "money is a sign of getting on" (i.e., making progress). When the President Abraham Lincoln was shot, the assassin uttered the phrase, "sic semper tyrannis." A man who gave evidence at the subsequent inquiry took this phrase as "sick send for McManus." McManus was said to be a local surgeon known to the witness. It is evident that the witness thought the assassin had spoken as he himself would have spoken. A writer says: "When I see the birds form their nests with so much art, I ask what master has taught them mathematics and architecture." Birds do this by imitating the nests already constructed; their teachers are their parents, so this writer mistakes the immediate for the mediate.

Von Bechterew points out that waking suggestion is much simpler in its nature than hypnosis. Some people are very impressionable, and many people "look for a sign." A student was unwilling to go in for an examination because he had forgotten his keys; he went in, however, and passed all right. A man was about to return home from his morning's sport because he met a red-headed woman barefooted. He was persuaded to go on, and brought back a good "bag." Coincidences are a material source of suggestion for some, not merely in dreams and events, but in suggestion. No doubt the saying of "the vicar of



Wakefield" that a certain event seemed associated with the fact that he "threw deuce ace three times running," was a suggestion arising from coincidence.

Portents have, in the past, played a very important part in mental life. "A little ere the mightiest Julius fell, The graves stood tenantless and the sheeted dead did squeak and gibber in the Roman streets, As stars with trains of fire and dews of blood, Disasters in the sun, and the moist star Upon whose influence Neptune's empire stands, was sick almost to doomsday with eclipse." Again

"He showed me on last St. Andrew's night in flesh and blood  
my future lover."

Dante, it may be remembered, says "It came to pass near the middle of my sleep that I seemed to see in my room seated near me a young man clad in pure white raiment, in deep thought, as his countenance showed." What the music of the Pied Piper of Hammelin suggested to the rat that escaped from drowning in the Weser is told in the following lines:—

"At the first shrill notes of the pipe,  
"I heard a sound as of scraping tripe,  
"And putting apples, wondrous ripe,  
"Into a cider press's gripe.  
.  
.  
.  
"And just as a bulky sugar puncheon,  
"Already staved, like a great sun shone  
"Glorious, scarce an inch before me,  
"Just as methought it said, Come, bore me!  
"I found the Weser rolling o'er me."

So much for suggestion. Also the Duke's

" . . . play on, give me excess of it. . . .  
Oh it came o'er mine ear like the sweet South that breathes upon  
a bed of violets."

The suggestions in these two latter cases stirred the mainsprings of action. It is likely that the rat, however, underestimated the importance of example as a means of suggestion. Myriads of rats would probably be a powerfully *attractive* company.

The so-called telepathetic suggestions or communications have to be separated from all possibilities associated with coincidence, illusion, and hallucination, if the results are to be worth considering. Many things in physical operations seem to show that a strain in the ether is easily produced by physical agents, and the extension of the theory or fact to biological units seems

natural, and, indeed, plausible. It is clear, however, that once out of the field of exact science, and over the fence into the domain of biological activities, one comes face to face with problems that can be viewed only a little beyond the surface, and we look for the effects of the actions of unknown living units, on other ill-understood living units to give us a hint with reference to the method of evolving acts, the transmission of these, and the cause of some being received by a second organism, and others discarded. It seems evident that some people are claimed by those in favour of transmission of thought as being very sensitive, by which is meant that they are tuned up to the receptive condition. Many claim this sensitivity also for themselves. There are, however, many examples of error. It seems to be true from some lists inspected that a large number of people may furnish records of neuroses. It is possible that the psychological views held by many experts in insanity are worthy of consideration, viz., that many of the acts in the life of an individual may be, strictly speaking, insane acts, and many thoughts evolved by the brain or mind of some may be hallucinations, but it is scarcely possible to measure a man or woman by any rule outside their own usual activities. To act otherwise would prove not only inconvenient, but a common source of error. The lives and actions of large populations are condemned by other large populations, who have been building on strong foundations, but the superstructure of one is regarded perhaps as fantastic by another. One must get suitable people to furnish us with examples, but people object to be placed under surveillance, and so many a brave investigator becomes timid.

One thing is certain, that the persons who give evidence in these questions are apt to be considered neurotic if they display a sensitive receptive nature. Word suggestion, sight, taste, muscle sense, hearing, touch; all furnish avenues through which suggestion can be made. Little is known with reference to the direct influence of one acting brain on another apart from voice, speech, movement, &c.

Children are largely instructed in the tales of fairies, ghosts, uncanny sights and sounds, unlucky acts or persons, and such-like, by those who have been similarly tutored. So we have the tales of the "Banshee," the "black woman," the "Raw head and bloody-bones," the "death warning," and hosts of other blood-curdling stories, with which the folk lore of all countries is replete. Indeed, once having made up one's mind that a pheno-

menal appearance takes place, natural objects may be easily taken for the uncanny creatures, e.g., "the horse carrying a headless man," "the white steed," &c. Faces in the fire are to be compared with this form of ideal reproduction or completion. Some fancied resemblance to a feature leads the observer to complete the picture. This is seen in many other objects, and the figures mentally completed with more or less acceptance as "signs" in many communities. Some, however, see things other than faces. Some build "castles and soldiers" in the fire as in the clouds. The peculiar fold of a fabric in the dull light of a corridor or chamber may suggest a complete figure, white or black.

Obviously community of sentiment is apt to be characterized by thoughts on the same lines. The setting sun may evoke the same thoughts in Galway and Vancouver, and if the wind carry bacteria the same peculiarities may affect persons in Albany and Omaha.

Within short range objects or words spoken or written may influence people. Great bodies of men may be moved much by acts of heroism, self-sacrifice, dire calamity, or events of supreme and sympathetic interest. Battle cries, mottoes, soul-stirring calls or tunes, the force of discipline, the call of duty and the martial spirit, which some leaders have had great power to arouse, all act as powerful suggestive agents. Courage and sense of duty may yield to automatism in their power or motives, and a word or wave of the hand may be potent enough to lead an army to victory.

It is possible that loud noises are liked better by horses and dogs than low sounds. This may arise from association. A loud voice amongst men is often associated with importance and gains respect, but a low, whispering voice suggests confidence and a "cooing" voice esteem.

Animals are apparently not ignorant of the value of cadence. The suggestion that may be at first psychic may implicitly involve various physiological activities, although after a time the psychic may remain in abeyance, and the physiological may persist. The use of tobacco produces nervous symptoms with which dyspepsia (and depression) become associated. A prolonged and continuous use is sometimes followed by a sense of discomfort, mental disturbance, and restlessness. After a time a whiff of a cigar may set the heart bounding, and lead to the filling of the stomach with air; so words or sounds may be succeeded by a train of thought or some emotional disturbance. The psychic again is apt to give

place to the physiological, and excitation of the heart and nervous system may be attended subsequently by a glowing optimism, which may become curative in cases of melancholia.

Suggestion from without, or auto-suggestion, is sometimes curative amidst depressing influences, and its encouragement seems a pardonable method of cure. It is obvious that it is susceptible of mis-use.

“ He prophesied such drought would fall,  
 And proved a sage indeed ; how came this lore ?  
 Because one brindled heifer, late in March  
 Stiffened her tail of evenings, and somehow  
 He got into his head that drought was meant.  
 I don't expect all men can do as much,  
 Such kissing goes by favour. You must take  
 A certain turn of mind for this, a twist  
 I' the flesh as well. —*Browning.*”

Amongst groups of people who have claimed the attention of their neighbours, and have gained consideration, are the women in various countries. It seems that the life of the ordinary girl or woman is less exciting and less accompanied by pleasurable suggestion and hopes than that of men. The desire for mental growth has been regarded as reasonable, open-air exercise, fresh air, sanitary houses have been in part obtained.

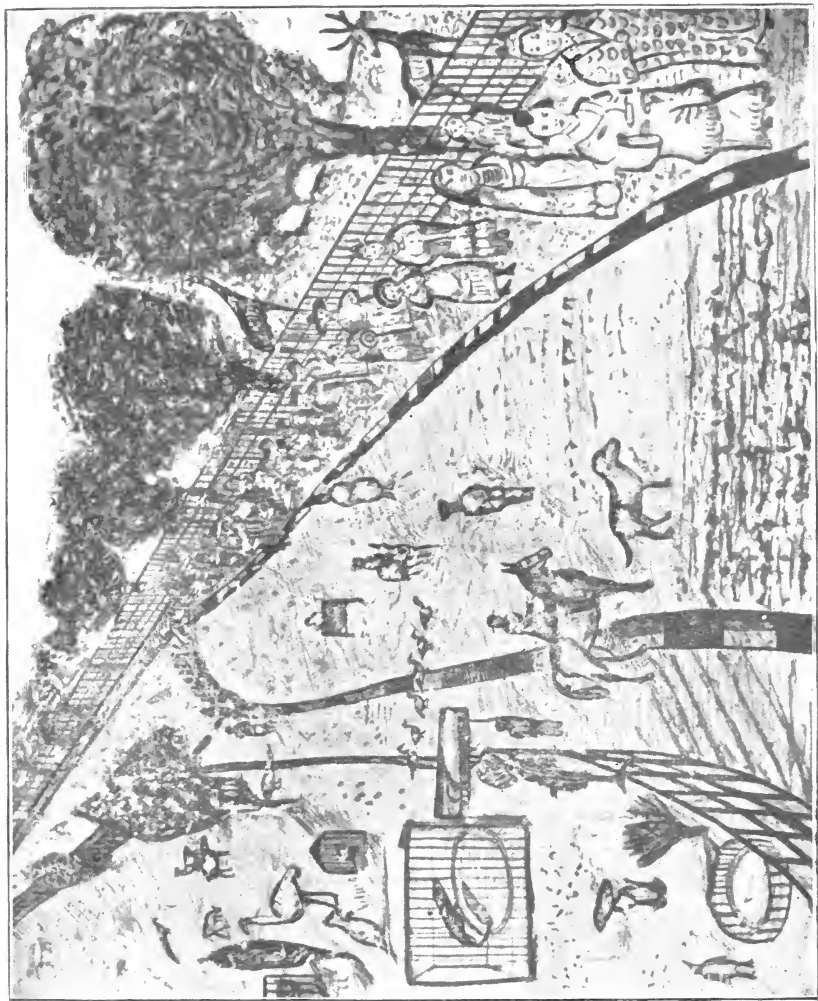
“ Woman will bustle, and woman will juggle,  
 And yet at the end will lose the day,  
 For hurry and hurry as best she may,  
 Man at one long bound clears the way.”

The temperament of women is said to require more exercise for their administrative capacity. It is certain that women are more religious than men. Whilst men in their exciting contests get chances of having their work appreciated, this fails in the case of women generally, who may spend their time amidst a hopeless and unsympathetic environment ; so they rather look to a distant happy future than to a present keen appreciation.

It is said that women in the far East feel their position somewhat anomalous owing to the great importance attached to progress. Many fatalities amongst young women are said to be due to this. It seems that the provision of proper material for thought and for imitation as well as suggestion by precept and example might mitigate the trouble for the young of both sexes.

HAMLET—There be players . . . that neither having  
 the accents of christian, pagan, nor man, have so strutted





and bellowed, that I have thought some of nature's journey-men had made men, and not made them well : they imitated humanity so abominably.

The following proverbs, perhaps, illustrate by suggestion former opinions in North West Europe. "Things without rule, a wife, a pig, and a mule." "A woman, a spaniel, a walnut tree, the more they are beaten the better they be." In the far East the position of woman is less satisfactory, "A dog is useful to kill a rat, a cat is useful to kill a mouse, but a woman has no more brains than a cow." M. Tallyrand, who would probably have looked with some apprehension upon the aphorism "See the ingenuity of truth, who when she gets a free and willing hand opens herself faster than the pace of method and discourse overtake her," was of opinion that societies cannot be consolidated without religion and distinctions (honours). The latter are earthly and are coveted by the rich and powerful, whilst for the poor happiness and honour in a future state is assured. O. W. Holmes was of opinion that the rich are commonly irreligious and that women are much more religious than men. The proverb "cadgers are aye crackin' of creels" is a masculine proverb. "Ne sutor ultra crepidas" is the Latin antithesis.

However vivid the mental phenomena are that the first suggestion evokes, the results may become more shreddy in the event of being repeated at long intervals, and finally an agreeable feeling or sensation may merely result from the suggestion, and the quicker beat of the heart may be the main medium in bringing about the result. A miserable, slow pulse, with depression, is succeeded by a more rapid, and even a bounding one. Sounds and voices, as well as words associated with anger are often more efficacious than quieting sounds, &c. It is not desirable to disturb the mental equilibrium always, but a study of the effects of sounds, words, or even syllables, or the catching modulations of the voice must prove useful. I do not allude to surprises which are often used by orators. The cultivation of the æsthetic is attended with many advantages.

"True comedy is said to be the art of teaching virtue and decency in action and in discourse, obviously from dress and deportment, by suggestion as well as by the style, intonation, &c."

A comparatively trivial presentation to the eye or ear may produce a very grateful sensation. Gesture and pose, voice, mode of arrangement of words ; all are effective, but a short word or a

portion of a word may be even more sufficient than a sentence. Everyone notices that the same word, or the same object affects different people differently.

“ Now, by two-headed Janus,  
Nature hath framed strange fellows in her time ;  
Some that will evermore peep through their eyes,  
And laugh like parrots at a bag-piper ;  
And others of such vinegar aspect,  
That they'll not show their teeth by way of smile,  
Though Nestor swear the jest be laughable.”

(*Mer. of Ven.*)

Suggestion is so potent, especially when emphasized by its accompaniments, or the absence of distracting factors, that one may attach undue importance to the physical effects on living organisms. Dull days are often associated with mental depression. Yet the lowering of the atmospheric pressure may not be very great. Nor on bright days can the atmosphere be said to be much heavier. Leaving out the cheering influences of bright days, in suggesting and promoting out-door activities, it seems probable enough that suggestion of brightness and light may have an effect on some, as dulness and darkness promote dismal thoughts.

HAMLET—I am but mad north-north west. When the  
wind is southerly I can distinguish a hawk from a hand-saw.

Lugubrious airs that are attached to a string of depressing words, even when these are formally disavowed, are apt to have the reverse effect of that intended, owing to suggestion. This instance may be quoted.

“ Away with melancholy, nor doleful ditties sing,  
Of grief and human folly, but merrily sing.”

On the other hand, over-strained attention or absorption may yield to a suggestion of a kind opposite to that which produces absorption of mind or depression. This is called sometimes a reaction or a rebound ; it may be a “ distraction.” It is, indeed, in some cases of periodic depression, that words, names, or acts, or a tune, or a voice, dissipates the oppressing incubi.

Knowing the relation of heart action to nerve activity, one might reduce to simpler terms the somewhat uncertain expressions of the rhetoricians. Perhaps one might even discover the tone, the movement that accompanied the word or phrase. “ I like every movement of my gown to tell ” said a forensic



orator. "Why do you weep so bitterly?" a judge said somewhat forcibly to a lad who was accused of a misdemeanour, "you are not accustomed to stand in a court of justice." "It is not that reason, but the lawyer who is speaking for me said I was to cry loudly at this time," said the boy.

Julius Cæsar, in falling from his horse in Africa, said "It is a good sign that Africa is under me; it is taking possession of it," "Your heart is as strong as mine" said an able physician, and the hypochondriac, whom he advised, went away with a new lease of his life. It nevertheless happens that words such as strong, dangerous, high, slippery, deep, fragile, are catching. Here is a sample of suggestive words:

"Though deep yet clear, though gentle yet not dull,  
Strong without rage, without o'erflowing full."

The word used in the case of dogs need not represent the sound or the complete sound, but it must be explicit without any uncertain ring: "Good dog!" "Fetch!" "'Ware duck!" are in their nature explicit. The rewards, or the caress, or the attentions are, like the incidental running or exercise, likely to bring pleasure.

The heart of a mammal is moved to activity by apparatus within itself, the nature of the fluid has an effect on the ventricle, serum albumin is very potent. The muscle of the heart partakes partly of the character of striated muscles, of non-striated muscle and of the character of neuro-muscular tissues. The contraction shows an obvious sequence in fishes. Ganglia in the walls between ventricles and auricles and between the auricles are responsible for the beat, but proper co-ordination is brought about by nerve connection between auricles and ventricles. The technical physiologist by isolating the physical, can enable the biological side of the operations of living organisms to have more concentrated attention at the hands of the zoologist. Ludwig's ganglia are inhibitory.

The happiness that one has in obtaining food (when hungry) is to be paralleled with the pleasure associated with collecting specimens of interest whether Archæological, Zoological, or Botanical, objects of art, early printed books, or manuscripts, or inscription-bearing stones. All these things, perhaps, (as does labour, skilled and unskilled) appeal to the mainsprings of action. The desire to acquire begins when the child reaches out for a glittering jewel, a bright light, or a reflecting mirror. The child

is anxious to carry his coveted possessions to his cot. Suggestions of a like kind, or better evolved, may secure the attention of those who have passed beyond childhood. It seems likely that the tendency to imitate the muscular movements and their expressions may lead to the evolution of emotions, and their ultimate repetition by association. One hears from time to time observations on the attractions that markets present for many, in a wide sense for most people. "Sell at home and buy in the market" says the proverb, clearly pointing out that only those who cannot buy in the market go to the place where the material can be got. So the institution which Minerva herself founded has been associated with civilization, and under her very eye, or her devotees, the institution is worked.

"S. S. 'Tis in the market place and street  
I had my birth and breeding too,  
And from a boy to blush and blink,  
I scorn the thing as much as you."

(ARISTOPHANES). (Frere).

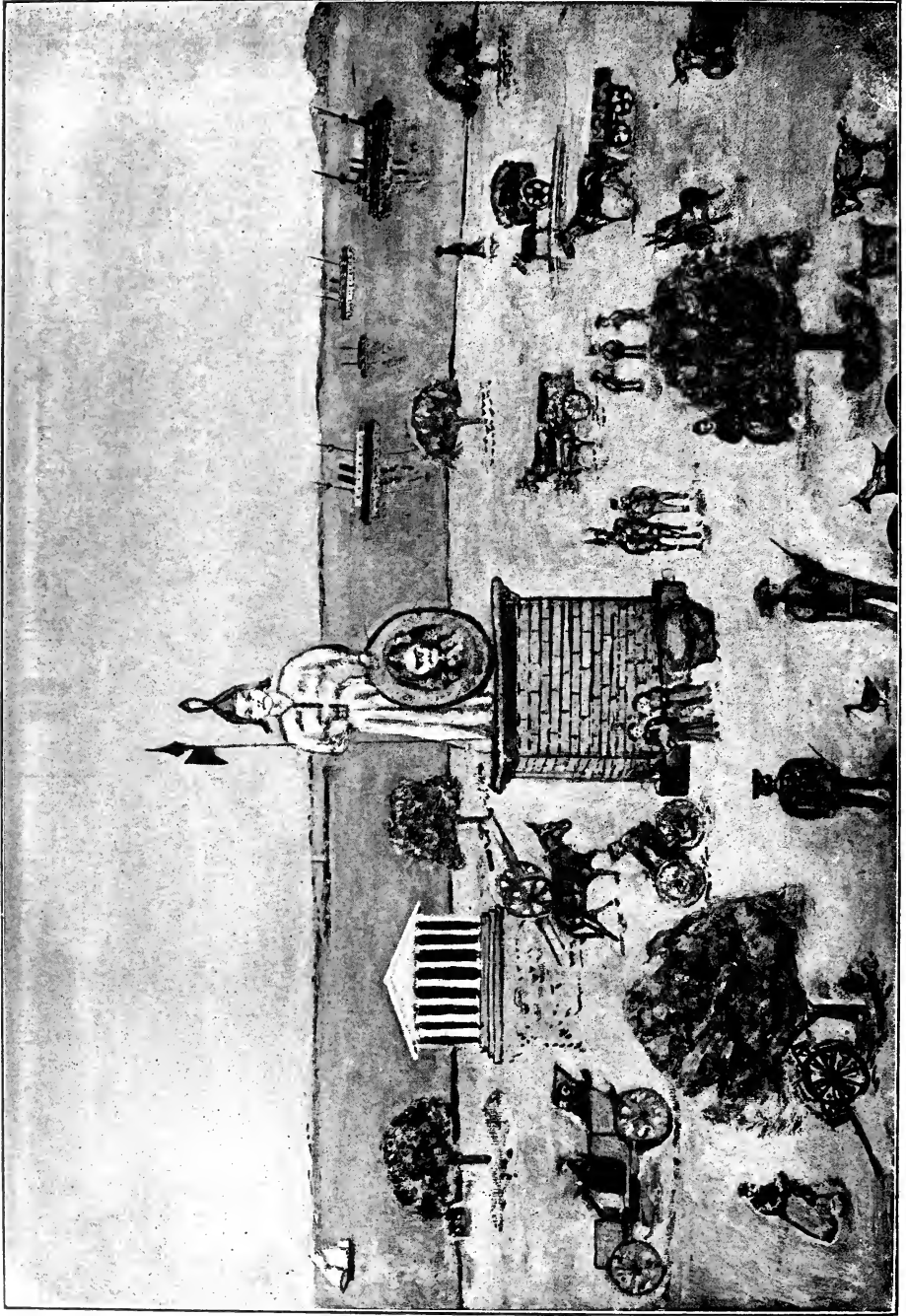
It appeals to the mainsprings of action which are, in the course of evolution, represented in part, by desire to acquire, and desire to distribute. The most frugal are the least anxious to acquire and to distribute (within moderate limits), the individual will be probably the happier, but a desire to disperse, with no sympathetic responses, and a desire to acquire, without obvious benefit, may lead to the mainsprings being attenuated or dried up. There comes into operation suggestions which prove very potent when there happens to be lack of knowledge, lack of self-denial, lack of forethought and lack of thrift. Suggestion may prove a salutary means of restoring the lost qualities, and may help to provide, or make provision, for the observance of a better and more hygienic mental code. The "heart moving word" were it possible to get such may save quarts of medicine.

"O mickle is the powerful grace that lies  
In herbs, plants, stones, and their true qualities."

"He sprinkles healing balms, to anguish kind  
And adds discourse, the medicine of the mind."

"Fictitious" suggestion is not without danger for those who seem interested in the patient may be interested in the procedure much more. Topical stimulants often are effective reflex agents of suggestion, as topical emollients, also, are well-known to be. The expectation of a definite action ensuing after the





administration of a drug leads to a cessation of pain, or to sleep in some cases; thus a person becomes salivated after taking bread pills, sleeps after taking a few drops of a bitter infusion, or expresses a great sense of relief after having the temperature taken by the introduction of a thermometer into the axilla. The soothing effects of a monotonous voice, a dull book, and rippling water are well-known. The suggestion of peacefulness leads some to assume the somnolent state even in church. "I do like to go to church on Sundays, I goes and sits down and cocks up my legs and thinks of nothin'" said the man in humble life who divided time into three parts, meal time, working-time, rest-time.

Suggestion by sight, hearing, or touch, may be in its nature, warning, irritating, depressing, as well as stimulatory or restful. Charcot, it will be remembered, could produce deep hypnosis by a look, or a touch, owing, in part, sometimes to association.

Where the sphere of a man's life is very limited, and his vocabulary small, a single word or sound may prove very effective and direct. Where the range of possibilities is great, and the value and importance of words, sights, and sounds, becomes abnormal, or susceptible of various interpretations the cerebration may become unusual. If, however, with an increase of the sphere of action and vocabulary, there is a proper apportionment of words and a just estimate of acts and sounds and sights, there is much less chance of simple suggestion being attended with abnormal results. Reflex always plays an important part. A slight stimulus is often succeeded with a complex series of actions. Of the second the shudder "as of one walking over the grave of a friend" is an example.

A Gordon setter that I once had would go into the water to bring out a stick, if his companion, a water spaniel, were prevented from doing so. An operator may endeavour to get a suggestion in of immediate or topical interest. Indeed, once established, cerebral internal actions with their corresponding external activities may assume great dimensions in the life of man and of animals.

"There are more things in Heaven and earth, Horatio,  
Than are dreamt of in your philosophy,  
But come;  
Here, as before, never, so help you mercy,  
How strange or odd soe'er I bear myself  
As I perchance hereafter shall think meet  
To put an antic disposition on,

That you, at such times seeing me, never shall,  
 With arms encumber'd thus, or this head shake,  
 Or by pronouncing of some doubtful phrase,

. . . . .  
 Or such ambiguous giving out, to note  
 That you know ought of me: this not to do.  
 Swear."

Suggestion bearing on thoughts, scenes, beliefs and emotions of early life are very potent, as Von Bechterew points out. The spread of a panic, as also the overwhelming terror, awe, dread or depression that "infects" a community have been observed and commented on. Prof. O. W. Holmes was of opinion that a form of insanity may develop owing to general suggestion (auto-suggestion, perhaps). A nervous aberration once having risen may grow in strength as it spreads, because of ochlotic (crowd) influences. Everyone knows that a mob may become an agent of destruction. "Tee veel folk" Peter the Great used to say, when people came crowding to see the Imperial ship-carpenter. Imitation must play an important part in such cases, the impulse to imitate may be strengthened from motives of self preservation, that tell one the disguise of a like emotion may ward off danger or antagonism. Once acquired, auto-suggestion may complete the catastrophe.

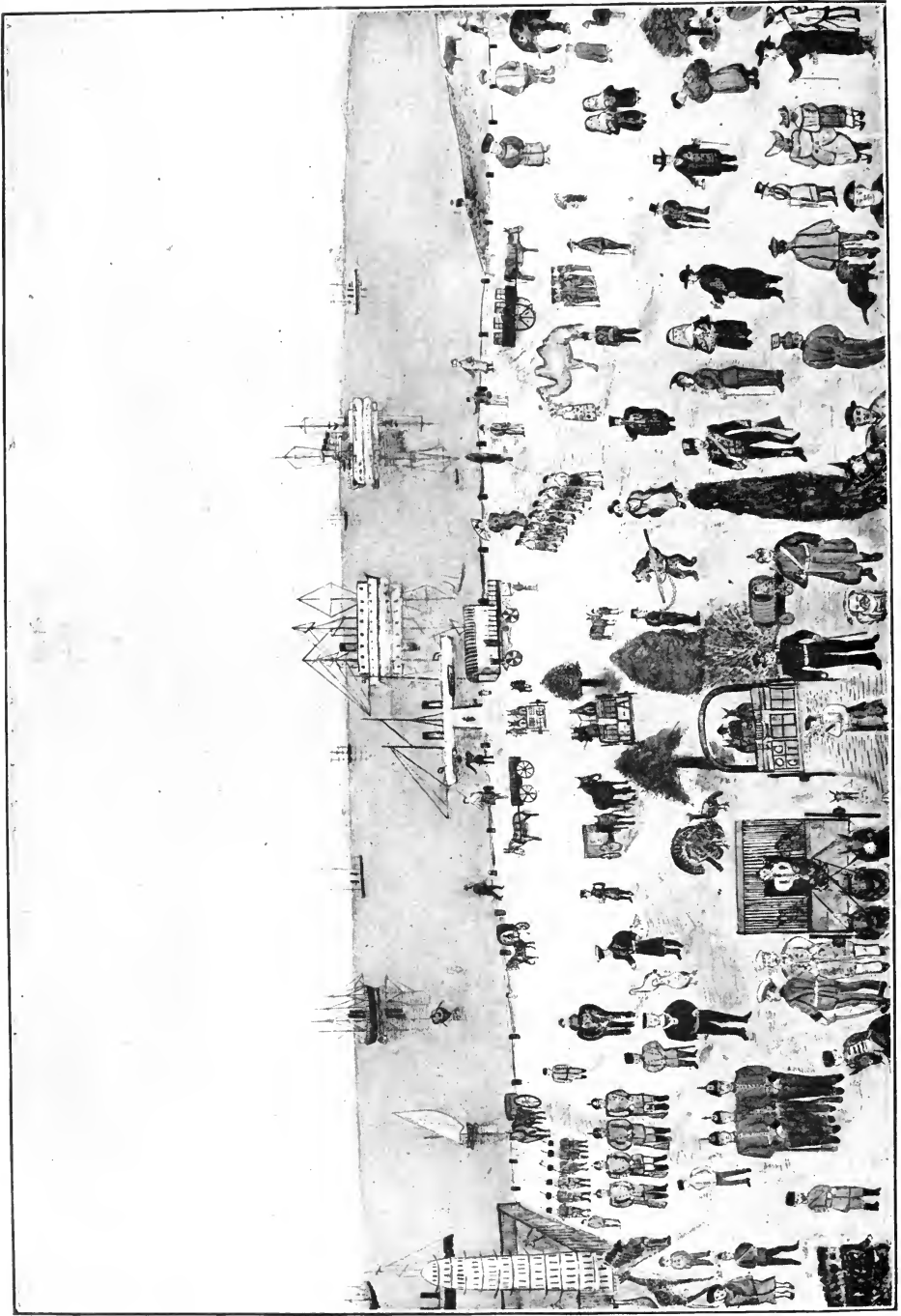
A crowd suggesting power or design may have its influence increased by the noise made. Children and animals are often terrified by such. Military crowds with war music and weapons are very suggestive, often stimulating and exciting.

"One wishes for on saint's day or a Sunday  
 A tale of war when there is time for it  
 To learn 'How they are busy killing one another'"

Noisy crowds cause panic amongst horses, dogs and children. A horse I once had retired to his house, under such circumstances and "lay low" on two occasions. A lad of five hearing the distant shouting of a crowd crept away from his friends and was found "huddled up" and fast asleep under a parlour side-table.

Printing presses, when these crowds mean business, cannot turn out sheets quickly enough for the public craving for excitement. "What side are you for" queried the mob-man to the late arrival in the U.S. America. "I am" replied he "for the people who are against the Government." Some people see in mobs an antidote for depression. Is this treatment a remedy or a cure?







Touch, pressure, and friction have been used to produce definite physiological results, viz.: to abolish or mitigate internal pain. The cause of the success of this may be due to diversion of nerve action, a disturbance of the lymph flow which may relieve congestion. All this may take place without hypnosis or psychic disturbance. The evidence seems to be against the view that sensitivity is, generally, a proof of higher cerebration. One cannot prophesy without knowing a lot of things (contiguity, sequence, antithesis, &c.), Factors may step in unobserved besides suggestion which come to man from feature, pose or movement. The instances that we have of the freedom from pain that those experience who are boxing, chasing, battling, prove how powerful is the excitement of the mind. One has in severe shock, after a severe accident, little or no local pain. One sees occasionally those who have had a hand crushed or the scalp torn off by machinery, and no evidence of pain, at first. It has been said and suggested that the position of the servant, the guided or commanded, is much more agreeable than the position of commander.

The private soldier of former times who served his full time in the British army came away comparatively fresh and unaffected by his service. Officers in command had acquired the furrows made by care and anxiety. The contention is that a feeling of security and protection is associated with obedience to the orders of a superior. The condition suggests the pristine condition of childhood, when the parental minds provided food and clothing, whilst the children gambolled and grew happy with the thought that they had unfailing protectors against all the world. The suggestion of strength (power) becomes associated with increase of number, and this reacts also through the commander on the individual. It takes maturity to enable the individual to understand this. However some think it "easier to teach twenty men what were good to be done than to be one of the twenty to follow mine own teaching."

Want of security and uncertainty for the future breed nervous dyspepsias that even the most exciting state polling contests fail to banish permanently. Auto-suggestion is invoked often to get rid of uncertainty, sometimes unfortunately.

The examples of expressions of the emotions in animals, discussed by Darwin in his epoch-making work, have been supplemented from time to time by numerous observers, and it is now almost certain that many give form and colour to their actual

ceration by their words, sentences, intonations, featural display, pose and movements. It would be an easy matter to prove that a person easily impressed with a confirmed tendency to imitate pose and gesture may unconsciously come away from a lecture, having a fairly good summary of what was said, and show a mind in action which is a fair reflection of the mind of the lecturer, so that one finds the words, gestures, &c., coined into mental metal again. It may be noticed however, that the person who has effected the transformation, may, one or two days after, give not merely the substance, but the actual voice reproduced from a central (attuned) group of cells. The same may happen with regard to music heard by people with this unconscious, or conscious power. First the probable reflex of the mind of the singer, or, at least, the conscious singing part, followed afterwards by the reproduction of the song or songs. The featural value of the superficial muscles has been recognized and urged by observers (Weidersheim in mammals, and several in the case of man).

The muscles and the bones may be affected by the tendency to imitate. The varieties noted by Krause, Grüber, Turner, Macalister, Le Double, and others, may be due to this cause. Just as outlines, without detail, are less fatiguing than a comprehensive photograph for contemplation, so the simpler the suggestive characters, if they constitute an index, the less the fatigue. The more salient features are more easily caught. Even undesirable featural peculiarities or peculiarities of pose or manner are unconsciously imitated by some, who have learned something of the individual by photograph or drawings; descriptions sometimes help. The result may be that the mental peculiarity of the individual imitated may be reproduced, in part. Forms of "thought reading" may arise from this imitation which may be quite unconscious, but may prove disconcerting or embarrassing. The same kind of training, and early acquired tastes, are each likely to be attended by certain lines of thought, so that if the rhythm be the same for two or more individuals, as well as the habits, collateral lines of thought may arise, which may look, at times, as if one person were reading the thoughts of others. One meets with examples of objects suggesting the performance of works, sometimes of high value. On the other hand "How oft the sight of means to do ill deeds makes ill deeds done."

The suggestion of results in a man's life answering to the "aspirations of his boyhood," renew his hopes. The music of his childhood has attractions for the "weather-beaten" visitor to the





country of his birth. Lord Avebury's account of the treatment of intoxicated ants is interesting, the picket threw the strange inebriates into the water, and brought their friends back to the hive. There seems to be sometimes, if not frequently, a power of selection, after suggestive stimuli, Mozart (and Shakespeare) has been quoted to illustrate the "automatic selective power of genius." Stories of fairies have apparently been due, in part, to the little notion that early men (like children) had of distance and size. This knowledge comes from experience. Colour comes in. A puny child suggested a "changeling." Acuteness of perception was, long ago, not understood and therefore was thought to be the result of witchcraft. Suggestion in Medicine led to the snail "cure" for frenzy, the hare skin cure for laziness and the pulmonaria cure for phthisis, etc. Suggestive signs are in use, e.g. the test of maturity by offering the person a doughy bun at dinner time. Judge a man's "character" (integrity) by his worst, and his intelligence by his best acts. Substitute signs are Mnemonics and are like symbols in Algebra useful until they have served their purpose. Differential suggestion enabled Helmholtz to suggest a means for detecting a spurious bank note, which if placed in a Stereoscope side by side with a real one will enable one to see better "whether all the marks are in the same plane" (Stout). The history of the Natural Sciences abounds with examples of the determination of differential characters. Instances like the following rarely occur now. A magistrate on entering a market town overheard a peepshow-man saying: "Now you see two alligators found on the banks of the Mississippi," he ran up to the showman saying: "they are my gaiters (yellow gaiters) you found on the banks of the Nore." Some people in a Scotch village brought a lobster to the village luminary to learn its name, etc. "It is either an elephant or a turtle doo (dove), said he, because they are the only animals with which I am not acquainted." "Talent" is suggestive. "The majority of men, when dishonest, get the name of talented more easily, than when simple, that of good;" "of goodness they are ashamed, of talent they are proud." The words "clever" and "too clever" are often used for dishonest. "Aggression for men of high station" at all events, "can be reconciled with a plea of right which it suggests." "Trickery is more likely to suggest insidiousness." Each portion of the central nervous system tends to inhibit all the parts below (or behind) it. Reflex action is sometimes insurmountable. C. Darwin tried to keep his face near the glass of a Cobra

cage, but could not when the snake made to strike. When the nerve centres or nerve terminals do not get enough nutriment, or stimulating substances, they become "stale" and lack precision. If they get too much rest they lack tonicity and co-ordination power. Horses and Setters give examples. Pointers and some other animals hold their training. Protozoa get exhausted after too much division. The afferent nerves of muscle are often very potent for reflex, especially after the muscles have been overstrained. Kneading evokes the reflex. Dyspeptic disorders of the alimentary canal are, if originated, apt to be evoked by cerebation of certain kinds, in some individuals. The laws of reflex are those of (1) unilateral distribution (2) of symmetry (3) irradiation (4) generalization (5) summation, a second stimulus or third supplements the first, even when introduced in time to catch on before the contraction has ceased (Allen). Influence of change of tension depends on the moment of introduction of variation (Kries and Sogalla). (6) of Co-ordination and adaptation. Muscles work in unison sometimes. The rate of propagation of a wave in muscle has been studied by Rollett. The rate is 0.116mm per second and wave length 0.097mm. Distractions are apt to diminish the value of reflex. The work of Ludwig, Kühne Kronecker and their pupils Dogiel, Bowditch, L. Brunton, and others, I have referred to (in a short paraphrasis in part from "Nature.") Cash, Romanes, Saville Kent, Gaskell, Paukul, Archangelsky, Imchatzensky, have been also referred to in the article alluded to. Kronecker showed that although a muscle of a frog may raise 20 grammes 2700 times, yet there are seasonal differences. Tension of the heart muscle increases the number and force of the pulsations (Ludwig and Luchsinger). This is seen in *Helix pomatia* where no ganglia have been found in the heart. The muscle acts as a neuromuscular organ, or resembles (in part) a cell with diffuse nucleoid elements. Engelmann proved that the bulbus aortæ in the frog contracts rhythmically without ganglia. Biedermann showed that the thin-walled heart of *Helix* when empty gave few and feeble pulsations, whilst slight pressure brought about intense rhythmic contraction. Schönlein proved the same for *Aplysia*; and showed that if the tension had been strong, and continued for some time, the pulsations persisted after the tension had ceased (compare rhythm in plants). Ludwig and Luchsinger proved the same thing for the frog, and the latter noticed that tension of smooth muscle had a similar effect. Excitability gets increased with increased

excitement. It may be that tension is an excitant, i.e. it modifies the "energetic" transformations; or modifications in contraction may be due to changes in the elastic medium. The restoration of tonicity by blue light in plants seems to have some "points of contact" with the effect of heat on muscle. Fick showed that twice as much heat was dis-engaged by a cooled muscle, during isometric contraction, than during isotonic contraction; although in heating, the heat augments equally for isotonic and isometric contraction. The effects of electrical stimulation is different according to circumstances. The elevation of the marker increases (1) with the increase in weight (up to a certain limit); (2) with the intensity of the stimulus (this is different for different muscles, sometimes increased stimulus diminishes the response). With a minimum result at 19°, there is a maximum at 0°, and at 30° in rapid heating. The duration of the contraction increases with diminution of the weight, increase of stimulus, and when the temperature diminishes. The tonic contraction of the snail's heart disappears with a rising temperature but returns with cooling. Light, and other stimuli, induce changes in plant cells. The leaflets that have drooped owing to darkness are restored by light, which is known to bring about chemical changes in inanimate, as well as animate nature. The pigmentation of the skin in animals and the green colour of plants are amongst its operations. It may be remembered that Richet, Chauveau, W. His (junr.), Pompilian, Gad, Bernstein, Grünhagen and Samkowy, Marey and Franck, and Weiss, have done much work to place our knowledge on a sure foundation in the above regard. Electrical phenomena in plants and animals owe much to Du Bois-Reymond, Burdon-Saunders and Gotch. Nerve work hurries up the phenomena of muscle contraction and the vagus appears to have indirect inhibiting control. Reflex action brought on by abnormal contraction may act through the branches of the vagus on other parts. Biological units are responsive to one or more forces in nature which they utilize. Plants use by their roots heat, gravity and moisture. Rheotropism, heliotropism, geotropism, hydrotropism and chemiotaxis are expressions meant to indicate the possibilities which are within the plant organism. "Science is presented to us," says Kelvin, "not as an entgötterte Natur"—it is not a God-forsaken, a soul-less nature consisting of force and light, chemicals and crystals, deprived of thoughts of God, deprived of life, which science contemplates." "Science brings us to the threshold of

life, and it knows its own incapacities to subject life to the laws of force and electricity." The attempt of biological units to appreciate biological units is attended with advantage, it is what is called by medical men, in reference to the touch, the *tactus eruditus*. This may perhaps be described as an attempt by an artistic method to learn a great many things in a composite form for comparison. Biological units avail themselves of the energy in nature, and save their own energy, themselves, and their race. If they fail to do this and to adapt themselves they are lost. Darwin and Wallace made this discovery about the same time, as Lord Kelvin discovered "Cosmic evolution as effected through the degradation of energy which determines the fate of worlds." (Prof. Larmor quoted by Sir. W. Thiselton Dyer). In animate nature "Automatic evolution towards improved adaptation in this case, with no limit or equilibrium in sight, is attained at the cost of dissipation." The appropriation of the energy by living things which may be in part a degradation of it may tend to delay an apparent catastrophe. One organism obtains energy from another. Emitted light and heat, the exhalation of water, or chemical substance, and changes in the electrical condition of one organism, may affect another. One may fairly assume that the development of the organs of sense proves the keen appreciation of the importance of appropriating as much available energy as possible, of which muscle sense is not unimportant. "The earthworm has no eyes yet it sees." Hence the importance of investigating the operations of living organisms, simple and complex, trained and untrained. The great complexity and variety in structure of the central nerve cells (alluded to by Macalister) make it appear hopeless to attempt any systematic research that could satisfy those who deal with biological problems affecting individual cells. Electricity and heat are conveyed by the skin, light is received and emitted by certain organs. The spinal cord of amphioxus may have sensitivity for light. Although a slight stimulus (the slightest) may be adequate to evoke enormous activity, the absence of certain stimuli may lead to inaction. The story of the well fed (inactive) rabbits on one side of the Malverns, and the sparsely fed animals on the opposite side illustrates this. We should perhaps sometimes be "placed with our backs to bright reality, that we may learn with young unwonted ken things from their shadows." One is prepared to accept explanations with reference to media that involve questions of transmission, reflexion, absorption and excitation. Heat



(radiated) is emitted, transmitted, absorbed, and the absorbing body is affected. It was said that there are "various finite forms in which infinite substance particularizes itself."

His quidem signis atque hæc exempla secuti  
 Esse apibus partem divinæ mentis et haustus  
 Aetherios dixerunt: deum namque ire per omnes  
 Terrasque tractusque maris cœlumque profundum,  
 Huic pecudes, armenta, viros genus omne ferarum;  
 Quemque sibi tenues nascentem arcessere vitas  
 Scilicet huc reddi deinde ac resoluta referri  
 Omnia nec morti esse locum sed viva volare  
 Sideris in numerum atque alto succedere cœlo.

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"Some have asserted that bees have a portion of the soul of the Deity and an inspiration of the ether; for that God pervades all the earth and the wide spread plains of the ocean and the deep heaven. That from Him all the flocks and herds—men—and every species of the beasts of the field; each at his birth detach their immaterial lives—and in sooth back to him again return all things after dissolution, and that there is no room for death, but that unkilld they wing their way from star and star, and pass beneath the lofty heaven." Translation of Isaac Butt, Scholar of Trinity College, Dublin, (afterwards an eminent advocate). "Modi are to the substance what waves are to the sea. Shapes that perpetually die away that never are," and again one may allude to the views of Leibnitz, viz.: "that body does not act on mind, but that the phenomena of both are so harmonized in the order of things—two clocks keeping the same time." Perhaps Leibnitz meant the relationship to be that of hyaloplasm to Spongioplasm, the former being the highly vital parts. Hegel and his school emphasized the triple nature of the mental phenomena, a somewhat similar arrangement is admitted in the physical and biological sciences. The phonograph and wireless telegraph apparatus serve to illustrate the subject from without. It does not follow that excitation, if transmissible, would be rendered in the same terms in two cerebra. The student who neglected morning chapel, said that the service was held too late, when the Dean asked him whether he found the hour too early. Queen Elizabeth remarked that Bacon's house was too small; Bacon said Her Majesty had made him too great for the house. Anger in one person may be very short madness, imitated by another it may mean even murder. One uses cells for a galvanic battery in numbers proportionate to

the electromotive force sought, arranged in a suitable way to answer the requirements. One should, perhaps, endeavour to obtain some evidence of the transmissibility of neuro-muscular movements by setting a large body of men to perform evolutions (all of the same kind and synchronously) and then at a distance of many miles further west seek for the effects (if any) on sleepers and others. Perhaps some may be found responsive, the reflexes being exaggerated. Consecutive or collateral thought, of course, as also synchronous (perhaps sub-conscious) thought may account for "*straight*" dreams, which are for children, savages, and others, often very real. The movements of the somnolent soldier or servant under command may be regarded as almost entirely reflex (regiments have fallen asleep on the march). The incidents in such cases may be forgotten if the attention be aroused. Compare hypnotic (superficial) sleep and "night mare." The morning gun has suggested a dream of a court martial and an execution. A dream suggested (on the other hand) to an Indian, the murder of a companion. Shakespeare makes Queen Mab bring on dreams by reflex.

"Drawn with a team of little atomies,  
Her waggoner a small grey-coated gnat,  
Her chariot is an empty hazel nut,  
She gallops night by night  
Thro' lover's brains and then they dream of love  
O'er courtier's knees, that dream of court'sies straight,  
O'er lawyer's fingers who straight dream of fees."

It seems that many dreams, omens and prophesies, may be misunderstood: "They will mis-carry, I recollect too many of them to my sorrer," said the disappointed man. Deep sleep is a sleep unattended by dreams.

Horace says:

"Atqui ego quum Græcos facerem, natus mare citra  
Versiculos, vetuit tali me voce Quirinus  
Post mediam Noctem visus quum somnia vera.  
In silvam non ligna feras insanius, ac si,  
Magnas Græcorum malis implere catervas."

"I once proposed to write  
Some Grecian versicles in 'deep of night'  
(When dreams they say are true). Rome's founder rose  
And awful spake: 'You may as well propose'  
To carry timber to a wood as throng  
The crowded writers of the Grecian song.'"

A mathematician sometimes solves easily during sleep a problem that gave him trouble when awake. It is evident that dreams may register synchronous thoughts as during waking hours one person may think collaterally with others (especially if they have had a similar training), and one person may follow a mental course subconsciously in the presence or absence of another who is thinking on the same lines. This subconscious thought may account for the fact that Turner stated that he never understood perspective, on which he lectured; and Vice-Chancellor Maziere Brady's decisions were said to be invariably right, his reasons for them invariably wrong. (1) A dream of the death of a friend, (2) of the detection of a crime, (3) of scenes of trouble and battles, may arise from synchronous thought. A clever general may trace a war with wonderful accuracy, and may beforehand calculate the times of events. Co-related lines of thought aided by letters, conversations, and newspapers, may develop synchronous states of thought which are very interesting. Awakening at the hour decided upon is an illustration of subconscious rhythm. The latter plays an important part in determining lines of action and thought. "A person sitting under cover on a Rhine steamer with a map and time-table before him may call out at intervals the names of the places on the bank which he does not take the trouble of looking at." Cross correspondence can be explained by collateral rhythm, or synchronous, conscious or subconscious thought. Waking or sleeping, the brain may produce or reproduce scenes, with very slight suggestion. A subconscious or reflex disturbance of the retina, or the conducting tracts, may affect the deep part of the nervous system. Amongst physiological suggestions comes a case of "dysphagia" in one person following a brain lesion in another person many miles away, apparently due to great sensitivity after receiving a letter from a nervous person recording the fact. (2) Hemiplegia (functional) in a middle-aged sensitive person following a brain lesion in another person on whom the former attended. As also the swooning of people in an out-patient department, when some trivial operation is being performed (tooth extraction). Proximity favours imitation, and sensitivity and absence of distraction (which is sometimes absent under depressing influences) favour the receptivity. It seems that it is not absolutely true to say "our thoughts are our own while we keep them in our hearts, but when we let them escape," etc. Our thoughts are often betrayed by feature, pose and acts, to the "grown ones they're so knowing." Remembering that rhythm tends to esta-

blish itself in plants (sleep movements, etc.) and animals. That laws of sequence, reflex, of suggestion, of space, minimal expenditure, minimal waste, and minimal power are constantly in force, and that more than one method is often used by animals to bring about the same result. Thus a muscle (or plasm) may act locally or by a wave of contraction passing over it, or by nerve action, or by some change in the fluids circulating in it, or a stimulus outside, electrical, light, chemical or heat, of which we have examples. We may say, at least, that if one neuro-muscular system can produce ether strain which would enable other neuro-muscular systems to perform their work more easily on encountering it, there would be an attempt to use it. One finds "the mystery of life in every bud, a mystery magic in everything *unknown*." "The fields, the air, the grove are haunted, and all that age has disen-  
 charmed." "Science is the illuminator which, if in its methods it is positive, yet in its operations outstrips romance in her most lofty flights." (Leighton)

R. J. A.

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