An attempt to detect the physiological processes by which thinking is effected : more especially in persons whose organs of sense are defective / by R. Fowler.

Contributors

Fowler, Richard, 1765-1863.
Royal College of Surgeons of England

Publication/Creation

Salisbury : George Brown, 1852.

Persistent URL

https://wellcomecollection.org/works/rgvqnp3m

Provider

Royal College of Surgeons

License and attribution

This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

wellcome collection

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

AN ATTEMPT TO DETECT

THE

PHYSIOLOGICAL PROCESSES

BY WHICH

THINKING IS EFFECTED,

MORE ESPECIALLY

IN PERSONS WHOSE ORGANS OF SENSE ARE DEFECTIVE.

BY R. FOWLER, M.D., F.R.S.

Second Edition.

"There is nothing either good or bad but *thinking* makes it so."
SHAKSPERE.

"Poor and content is rich, and rich enough;
But riches, fineless, is as poor as winter
To him that ever fears he shall be poor.—IDEM.

SALISBURY:
GEORGE BROWN, NEW CANAL.

LONDON:
J. CHURCHILL, PRINCES-STREET, SOHO; AND
C. A. BARTLETT, 32, PATERNOSTER-ROW.

1852.

SALISBURY
JAMES BENNETT, PRINTER, JOURNAL OFFICE, CANAL.

PREFACE.

THE purpose of the Author of the following pages is to state some additional facts, (beyond those formerly published by him), respecting the Deaf, Dumb, and Blind, which may admit of a physiological explanation, and suggest expedients for their relief.

The problems he hopes to assist in solving by these facts are—How, in the absence of Sight and Hearing, the Blind and Deaf should still have more intelligence than the most sagacious of inferior animals?—and how, by touch alone, the meaning of others can be communicated to the Blind and Deaf, and by them be so instantaneously interpreted?

In connection with, and in further illustration of, these inquiries, the Author has appended a few occasional thoughts that have occurred to him in pursuing this subject, on the *rationale* of various mental faculties in man,—some of which, he conceives, have been but imperfectly investigated, and therefore unsatisfactorily demonstrated by Physiologists.

MILFORD, SALISBURY.

SEPT., 1849.

EXPLANATORY PREFACE.

THE subject of the following pages is an attempt to ascertain how, and by what instrumentality, we Think. It certainly is not by the mind alone. The component parts of a human being are Mind, and the vitality, organisation and matter of the Body. The functions of the mind may be suspended, as they are in suspended animation from drowning, and even fainting; while the vitality, organisation, and matter of the body remain. I have often excited contractions in the legs of decapitated frogs after the fourth day. We have, then, four distinct component parts subservient to thinking, not one of which can be withdrawn, or have its influence

suspended without the extinction of Thinking.

The changes in all the merely material parts of our world are referable to the agencies of gravitation, motion, chemical affinities, light, heat, &c. These are known by their effects only; for, in truth, all our knowledge is of phenomena. But those of life differ so essentially from any assignable to the physical phenomena, as to satisfy most persons that other forces must be in action to produce the phenomena of Vitality and Life, and are distinct from organisation as is the elasticity in the spring of a watch from the organisation of the wheels to which it gives motion.

For these reasons I trust we are warranted in considering Mind and Vitality as distinctly Forces, as any of those by which physical phenomena are produced.

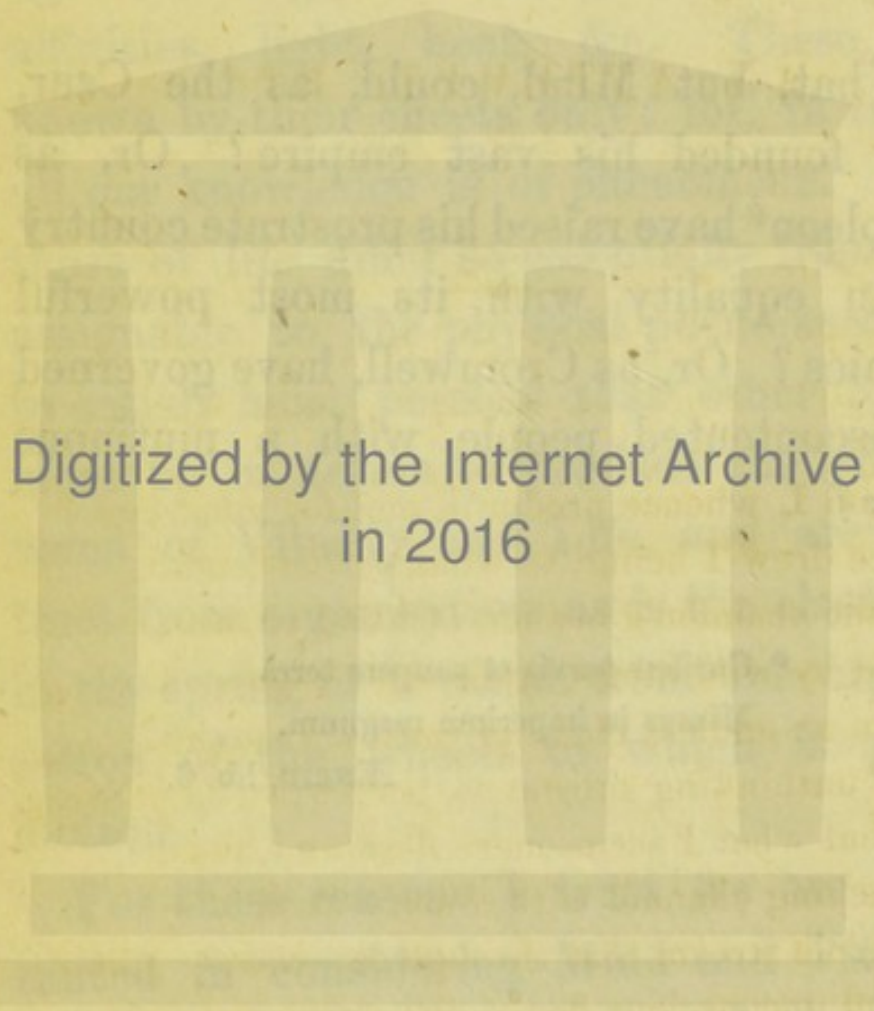
What merely physical force could have perceived the relations between the planets Herschell and Neptune? indicated by per-

turbed movements, and from them calculated the exact place of Neptune and the orbit it was describing.

> " A— was told, but did not believe ;
> B— beheld, but did not perceive."

What, but Mind, could, as the Czar, have founded his vast empire? Or, as Napoleon* have raised his prostrate country to an equality with its most powerful enemies? Or, as Cromwell, have governed a discontented people with a mutinous army?

* Curibus parvis et paupere terrâ
Missus in imperium magnum.
ÆNEID, lib. 6.



Digitized by the Internet Archive
in 2016

https://archive.org/details/b22314891

AN ATTEMPT, ETC.

What am I, whence produc'd, and for what end ?
Whence drew I being, to what period tend ?
Am I the abandon'd orphan of blind chance,
Dropp'd by wild atoms in disorder'd dance ?
Or from an endless chain of causes wrought,
And of unthinking substance, born with thought—
Am I but what I seem, mere flesh and blood,
A branching channel with a mazy flood ?
The purple stream that through my vessels glides,
Dull and unconscious flows, like common tides,
The pipes, through which the circling juices stray,
Are not that thinking I, no more than they :
This frame, compacted with transcendant skill,
Of moving joints, obedient to my will ;
Nurs'd from the fruitful glebe, like yonder tree,
Waxes and wastes—I call it mine, not me.

New matter still the mould'ring mass sustains ;
The mansion chang'd, the tenant still remains ;
And from the fleeting stream repair'd by food,
Distinct, as is the swimmer from the flood.

ARBUTHNOT.

FINDING that the deaf and the blind have all the intellectual capabilities of others whose senses are perfect, but that all animals, who are intellectually inferior to man, have organs of sense, and even the muscular sense, more perfect than the corresponding organs in man, I began by investigating cases of blindness, deafness, and more or less of deficiency in all the senses. My first inquiry was as to the intellectual capabilities of the more sagacious of the lower animals, since if all the materials of human knowledge came through the external organs of sense, more might be expected to have entered through all the more perfect senses of animals, than by only a few, and those the less perfect senses, of such persons as Laura Bridgeman, Anna of Bruges, and Margaret Sullivan, of Rother-

hithe,* or even of Drs. Saunderson and Moyes. But the very reverse is found to be the fact. How was this to be satisfactorily accounted for? A more sifting scrutiny of facts, of sensations, and the conditions with which the impressions were received, and the modifications to which they are subjected by our muscular sense of the adjusted state of our organs, and the mind's perception of the reflex influence of the internal senses and brain, was found to be necessary. Animals are destitute of language as an instrument of thought to give fixity to the impressions on the senses, so that they may again and again be considered, compared, and afford time for perceiving all the complicated relations they may bear to each other. In the absence of this faculty, animals are not only unable to be accurately impressed by individual objects, but they never can have that clear per-

* I saw this patient (whose case is related in my former pamphlet on the Deaf and Dumb) about two years ago in an Infant School, seemingly comfortable, and occupied in knitting stockings.

ception of relations which constitutes science, and directs the execution of works of art. Animal deficiency is, therefore, attributable to the want of the hand, speech, a brain of more complicated organisation to modify the impressions it receives from the senses, or time to collect materials for induction, or opportunities of availing themselves of the knowledge of others,—even our domestic animals dying before they have attained the age of an ordinary school-boy.

The main-spring of a peasant's watch and of an astronomer's chronometer, give an impulsive movement, the same in kind and in strength to both; but it is the modification by the wheels within which gives the superiority to the chronometer. Each of our organs of sense has its specific appetite for its appropriate objects, and its muscular sense in all its adjusting muscles of the organ for examining them. But brutes want the hand to handle objects, and give that variety of intimations to subject them to the examination of the other senses. They

also want time and conveniences for making such examination. How long a profound thought is before it can be matured! Even in the combinations and relations of chess,—so much more easily perceived than those of any branch of science, since all the objects are within the grasp of a single glance,—how long does it sometimes require before the best player can be sure, with all the effects of his move in view, that he may not have committed his game by the relations he has changed? Man may reverse or correct an error: an animal has neither the hand, the aids, nor the time in which this might be done.

To any person who will accurately attend to his feeling while cutting a piece of paper or coarse cloth, it will be obvious that his feeling of the several threads is in the excitor nerves of the muscles, and not in the specific nerve of touch at the ends of his fingers; and it is equally true of all our organs of sense that their perceptive sensations,—such as give distinct knowledge of the quantities and relations

of objects to each other,—are effected by the muscular sense of the muscles moving and adjusting the organs of sense for search, and not in their specific, which serve only as finders of the whereabouts of the appropriate object of the sense impressed.* For example: we must look to see, listen to hear, handle to feel, sniff to smell, and bring an object of taste in contact with the palate, tongue, and lips. A slight alteration, either in the object impressing the senses, or in the condition as to temperature, excitability, or exhaustion of the organs themselves, changes our perception of them as much as the addition or substraction of a figure in an arithmetical sum would alter the expression.

Dr. Wollaston has shown how changes in the contour of the mouth, or in the disposition of the brain, may change the expression of all the other features. Man's distinctive character is to act, though in

* A sixpence pressed on the forehead leaves the belief that it is still there when it is not—a proof that the mind has to deal with the sensation only.

part, from instinct, in greater part by induction from full enumeration of facts searched for, and estimated by number, weight, and measure; and in concurrence with the laws of nature of definite proportions observable in all the natural phenomena with which we are surrounded.

Now taking into consideration the appetites of each organ of sense for its appropriate objects, and the necessity of substituting a perfect organ to search for it (as the left hand for the right, toes for fingers, eyes for ears, &c.) we arrive at the fact, that it is by a more adroit employment of the muscular sense—the adjuster of all the other senses—that the blind and deaf are enabled to supply the defects of any of the other senses; and it is only by bearing this in mind that all their peculiarities can be explained.

That more intellectual knowledge is obtained by the muscular sense than by the specific nerves of all the other senses, I collect from all the facts that have come to my knowledge from the evidences of the senses. Two gentlemen of competent

education, and observant of their sensations, have repeatedly stated, that since the amputation of a hand from the younger (about 36,) and of a leg from the other, both daily while at rest forget their loss, and feel as if they were still touching and grasping, pulling and holding. A blind but learned mathematician at York, fond of experimental and natural philosophy, and who makes the greater part of the instruments he employs, told me that all his *specific* nerves of sense are *less sensitive* than in the generality of persons of his age and habits; but the structure of his brain being perfect, the defects in the specific organs of sense are supplied by the accuracy of the muscular sense, by which they are adjusted to search and examine their appropriate objects.

In the reception, perception, and modification of the sensation it receives, the functions of the brain may be conjectured to be as complicated as its structure. But a moment's attention to the effect of a reflecting cone placed in the centre of a circular amorphous draw-

ing of an animal, may show the perception of relations of parts to each other, and the sum of them all, to be more simple than had been conceived possible.

Every sensation is ascertained to be some change in an organ of sense perceived by the mind; but I am anxious to draw attention to the fact, that it does not seem to itself to perceive the sensation where it really is, but as if it were *projected* to the place of the object which excited the sensation, and it is there that we seem to have (if we have our eyesight) a visible CONCEPTION of the object. If, for example, I hear the rumble of a coach on a distant road, the sensitive corporeal change in the ear is unheeded, and my thought of the coach is projected (as it were) to the visible distant vehicle.

A long and careful consideration of the processes by which the reciprocal influence of the specific nerves of sense on each other, but more particularly on the muscular sense by which the muscles for adjusting specific nerves are excited, and conceptions formed, has suggested the

probability that this may be the real physiological process in the law of nature of association of ideas. This process I find to be the following: a specific nerve of sense is impressed by its appropriate excitor, as light, sound (vibrating air), odour, contact (which excites to feel, and then only have we resistance and sense of touch), taste,—terminating in the brain. From this specific, a re-transmission to the muscles adjusting the organ for perceptive sensation, and when this is attained, a second re-transmission, issues from the brain to the muscular sense of the muscles of the organ to be employed in further search, or to the executive muscles, as from the eye of the sportsman or tennis-player, till he has exact perception of his object, and its situation relatively to the muzzle of his gun, or more generally to his hand, which is then, by such re-transmission, adjusted for action. It certainly appears to be by their instrumentality that the chœtodon, (Chinese squirt fish,) the hawk, the vulture, and the horse about to leap, so accurately measure distance.

Is not the greater part of this process effected by the agency of the fifth pair of nerves ?

From the facts now deduced an explanation may perhaps be satisfactorily inferred why it happens that mere contact does not suffice for distinct sensations of touch, or any other sensation. For certainly the sensation ceases, if we cease to move the organ.

By the specific nerves we have no more than the specific qualities of bodies which excite them. Our knowledge even of their extension is obtained from search. Two boys couched by Sir E. Home, were asked how many angles they saw in a pasteboard placed before them. They took some time to count the angles before they could answer. This solves the question as to the activity of the mind in sensation, and why, when we cease to search we cease to feel.*

* If zinc and silver are placed in contact with the tongue, and then with each other, leaving sufficient intervals of time between the repetitions of contact to observe the effects, it will be found that a metallic taste, with increased sensation of heat, occur only at the moments of contact and separation. Analo-

That sensation depends on and exists in the state of our sensitive organs, we have this proof. Every sense has its specific appetite for its appropriate object. Mitchell (described by Professor Stewart) although blind and deaf, as relative to perceptive sensation had still such exquisite delight from mere light and sound, that he would sit for hours while a ray of light shone into his eyes, and the tinkling of a key struck on his teeth. That these appetites depend on the mind's perception of the changes which have occurred in the organs in which the appetites are placed, is evident from the fact that no corporeal appetite continues after its full gratification.

Our appetites for air, warmth, food, drink, movement, sex, odours, tastes, cease when gratified to satiety, and we wait nature's time for their revival. Now as our intellectual instruments for thought

gous to this, a flash of light is seen in the dark at the moments of contact and separation of a crown piece placed between the cheek and the gums of one side of the mouth, and a plate of tin-foil or zinc in the other: the contact between them may be made with a tea-spoon or a strip of tin-foil.

and speculation have the same laws of excitability, excitement, and exhaustion, must it not be suspected at least that they partake of like organization?

Sir A. Cooper's experiments by pressure on the carotid and vertebral arteries prove, that not only animation, but consciousness are suspended by obstruction of the passage of the blood to and from the brain; and attention to degrees of sensation in different parts shows, that every where sensation has a direct ratio to the quantity of well oxygenated blood freely flowing through the part.

There are other observations by Sir Ashley Cooper in proof that not only the permanent sensibility of parts is dependant on the quantity of blood which flows through them, but that every, the most transient change of thought is accompanied by an accelerated flow of blood on the surface of the brain. For example, he relates the instance of a young gentleman whose brain was denuded, by the fracture and displacement of a portion of the skull, whereby the surface remained

exposed: affording opportunities of observing increased redness accompanying every, the most indifferent, change of thought.

Other convincing instances will occur to all who patiently give their attention to this subject. How important a part the mind acts in sensation is clear from the fact, that simultaneous sensations are incompatible with each other, as with thoughts employed on various subjects: we seem to have no perceptive sensation of a subject read to us, while thinking on a subject of more immediate interest. We have sensation of the voice of the reader, but not of the meaning of what he reads.

As conceptions equally with sensations are effected by muscular adjustments, is it not likely that re-transmission from the brain, excited by sentient nerves, should pass as well to the muscular fibres of arteries as to those of the adjusting muscles? This is rendered at least probable, that an arterial supply of fresh blood is essential to the efficiency of the brain, nerves, and muscles. This is shown

by the numbness and loss of muscular power felt in a limb when the arterial flow has been obstructed, and above all, by faintness when too much blood has been withdrawn.

POWER.

Mr. Hume has said that we have no idea of power, since we cannot name the impression by which it is excited. The impression from which we have belief of power seems to be, that from the muscular nerves a sense of pressure is more or less felt, from contraction of the muscular fibres. By a sense of the minute degrees of sensation from pressure, the players on stringed musical instruments measure, as vocalists, their voices, and the sculptor the stroke of his hammer,—measuring the various degrees of effect they shall produce. The feeling of power is, I conceive, the source of our idea of cause. Feeling a resistable motive to some gratification may be the impression

from which the idea of cause gets into the mind; and feeling that we can resist the gratification of an appetite or a passion seems to be the source of our notion of power.* Is not the impression made by the pressure of contracting muscles on the sentient extremities of their nerves, the organ of the muscular sense?

ASSOCIATION OF IDEAS.

May not the physiology of ideas having such affinities that they immediately associate, be the following?—By a law of nature of muscular adjustments, sensations are distinctly perceptible or not, in the ratio of the accuracy of the adjustment by which they are effected; and no two sensations can be accurate and perceived with precision by one and the same adjustment. But our adjustments may

* The following passage in *Othello* may be adduced in illustration of this thought:—

"Fled from her wish, and yet said now I may."

coalesce, as shown by Lord Kaimes, in emotions and sentiments and passions,—the conception acting as the excitor of all the motary consequences.* One bright idea lets in all the rest. Is it not thus that any one reading a subject of which he knows something, recognises the meaning of all the words as they occur by a sort of anticipation? Thus we infer the oyster from its shell, a distant ship from a top-sail, &c. But as there exist no analogous ideas in the mind of an ignorant reader, every new word is to him insulated and alone, and without the meaning it would have from the context in the mind of one better or more extensively informed. Hence the conversation of people who have different pursuits is like the finger-talking of the blind—an affair of allusive touch and go—hardly ever of fully detailed expression.

* In the case of a murderer of his own child, which came under my observation, the conception impressed by a beautiful second wife, eclipsed that impressed by his artless child, where the feeling of natural affection was preternaturally strong—so as to prevent the culprit from sleeping after the murder.

FORMATION OF THOUGHT.

THE root of that you mean to grow must be put early into the mind, as is a nucleus for chemical affinities to rally round. Therefore, in education the Jesuits searched out that prevailing idea in the mind, and taught by the laws of nature or association of ideas. A boy wishing to be a soldier, sailor, medical or legal man, should be freely supplied with appropriate objects of study. It was thus that Hunter, Davy, Priestley, Dr. Faraday, Watts, Newton, Franklin, M'Adam, Herschell, and others were formed. To think with advantage, all sensations and new facts must converge to a point: we must have something in the mind to think about. Now all animals of prey have this faculty naturally,—shepherd's, drover's, and sportsmen's dogs and hunting horses conventionally, and limited to one object.

I had read of animal carbon as an antidote to several poisons; but it did not occur to me till a night had passed,

that this might be effected by the electric attraction of charcoal for the oxygen which renders arsenic and other poisons destructive of life. But why not till after a night? I had been fatigued when I read of the charcoal, and the circulation through the brain was therefore less active, and obstructed by effete particles. After sleep and fasting, all its parts were rested and invigorated by the removal of useless atoms, and the re-placement of new.

HOW DO WE THINK?

Our curiosity or interest aroused, we watch all objects, persons, and relations of things that present themselves: we class and enumerate what are like or analogous to the subject we wish to know, and then induct.

Let any one try this, *via intelligentia*, and he will find it is by recollection and enumeration of all the facts on any subject, and noting their tendency by analogy

of relation to one common centre,—the inference or induction from which is a thought.

MEMORY.

To regain a thought escaped from memory, trust to the laws of nature of association, by going to the place or person where the thought was last recognised.

The more intellectual minds discard from consideration facts and observations irrelevant to their purpose, while those who have no purpose retain them. The philosopher is intent on the relations chiefly, the common mind sees objects merely.

Sight and hearing have reiterations constituting memory. Touch, taste, smell, and the muscular sense of pain, have memory of the occasions which can be recalled to the eye and the ear, but not recalled as a reiterated sensation.

A workman became mad immediately after he had deposited his tools for safety

in a hollow tree, and for sixteen years was unable to say where they might be found. On recovering his senses he asked for them, but on being told they had not been found, he went to the place of their concealment without hesitation. This man's adjustments having been deranged after he had deposited his tools, could not form memory by the same adjustment with which he had deposited them. But on his recovery of the sane and normal adjustments which were in action when he deposited them,—being reiterated on his recovery,—this constituted his memory, and directed him accurately to the place. Is not this analogous to the changes which occur in the muscular relaxation of sleep, intoxication, or asphyxia? In this state nothing is remembered, unless it had been strongly impressed, as in such instances of remorse or passion as the poet Thomson, Mrs. Norton (in her Gypsey), Pope (in his Eloisa), and Shakspere (in his Lady Macbeth), in

"Thoughts that breathe, and words that burn,"

have expressed; but when the adjusting muscles have been invigorated by sleep—reiterated adjustments constituting memmory of the past,—sensations occur spontaneously.*

MAN.

MAN must be studied as a whole, and not the body apart from the mind (as by the anatomist and medical man,)—since the pre-established reciprocal influence arising out of structure, functions, and mutual dependencies, make it impossible to judge of the phenomena of either without taking both into the account.

IDIOTS.

IDIOTCY seem to be the result of a deficient muscular sense, since idiots are with difficulty taught to measure, although

* With a drum well braced, the sober drummer plays "God save the Queen" distinctly; but the beat of a drunken drummer on an unbraced drum is inexpressive of meaning, till the drummer is again sober and his drum braced.

they have a sense of rythm from well-measured musical time,——therefore, I would recommend teaching them to measure—*i. e.* to count numbers—by mechanical means.

From the increased interest which has been excited, and attention given, to relieve diseases of all kinds, but more especially such as by affecting the intellects, degrade the condition, and reduce the comforts of the insane, the idiotic, the Cretin, and all whose happiness and utility are abridged by defects in the external senses,—medical men and physiologists in every part of Europe have arrived at this very satisfactory conclusion, that the apparent mental deficiencies of the sufferers, are owing to defects or derangements in the structure, or of such functions of the body as are instrumentally subservient to the mind; and therefore that many of these impediments to the normal perceptions, volitions, and right apprehensions of the mind, are removable or remedial, when the structure and functions of the body have been carefully

attended to, and put in the most efficient state of health of which they may be susceptible.

This has been done in Switzerland, by the removal of Cretins from the confined air of the ravines in which their childhood had been passed, to situations where there was no malaria,—where both air and water are pure, and where they were regularly washed and exercised, had wholesome food and proper clothing provided for them, and were taught how best to observe the common usages of life. They have then been uniformly found susceptible of a greater part of such instruction as children in ordinary schools are capable of receiving.

As all the organs of sense are adjusted, moved, and dependent for their efficiency on the fifth pair of nerves, and as branches of these ramify over every part of the scalp, this should be washed and rubbed with soap and water two or three times a day, and then be rubbed dry by the patients themselves with a coarse rough towel.

The muscular sense (inherent in its appropriate nerve in every muscle) should be drilled by manual exercise. Prehension may be taught by grasping the steps of a ladder held by the teacher on the opposite side, to guide the hands and feet of the idiot. To give dexterity to the hand, the eyes and the feet, a hoop or a shuttle-cock may be used. Drawing on a black board is useful in cultivating touch, imitation, and definite proportions.

THE PROPER STUDY OF MAN.

MAN must be studied as a whole, by analysis of all his manifestations,—by our own consciousness, and our interpretation of the words, looks, gestures, and actions of others; or in one word, by his expressions. To make such an analysis requires the power of making our own feelings and thoughts, sensations, conceptions, and inductions, the subjects of as close attention as a painter can give to the picture he is working on. It requires also as

much observation as a man of the world—a Scarlett—could give to a jury; a minister, who reads men's thoughts at a levee; a Garrick, who interpreted and imitated all that can be expressed of internal feeling, and was himself susceptible of all functional adjustments.

The mere physiologist has not done this: the psychologists have not been sufficiently aware of the machinery by which the formation of thought and thinking is effected. This want appears to me to have been the want of Hume, Berkeley, Kant, and most mere metaphysicians. Locke was a physician as well as a metaphysician. But the muscular sense had not in his time been discovered.

THE SENSE OF TOUCH.

The late Sir Charles Bell has treated the sense of touch so accurately and so fully, as to have left no fact of importance unexplained. I beg therefore to be under-

stood as not aiming at more than an application of his anatomical and physiological discoveries, to account for peculiarities observed in persons in whom one or more of the organs of sense are deficient. A young gentleman, aged eighteen, blind from his birth, upon being couched, could not recognise by the eye what he had felt with his hands, till he had again examined the objects concurrently with both senses; or as he expressed it, till he had seen them at the ends of his fingers. Other similar instances of this sense of touch will be found in the succeeding illustrations of the muscular sense in the blind and deaf.

VISION.

May not the long-discussed question—How we see objects upright, when in the retina of a dead eye, they are seen inverted?—be satisfactorily answered by the feelings we have of up and down in the *occipito frontalis* muscles, when with

an unmoving position of the head we raise our eyes to see the top of any tall object, and then depress them to look at its lowest part?

The eyes are not fatigued by writing, because the thought is instinctively followed by the requisite adjustment; but they are fatigued by long reading, since many muscular efforts must be made to adjust them to the letters, and by so doing the adjusting apparatus is strained.

PRACTICAL EDUCATION.

We should teach all children to search out the "what for?" or final cause, since this is to search out God, and to learn how he works, that we may endeavour so to work.

It might be well frequently to exercise children in what it would be best to do in a sudden emergency—for example:

1. To lie down and roll in the wet, on a carpet, or on the floor, if on fire.

2. To slacken the clothes in a fit, and pour cold water on the head.

3. Not to move a fractured limb.

4. In nursing another child, to carry it on alternate sides.

5. Not to catch by the arm a falling child,—and so forth.

COMMUNICATION BY FELLOW FEELINGS.

How do the blind and deaf interpret the intimations of others by touch alone? Caresses and repulses are intuitively known by the muscular sense; and when such communications have been often repeated, their slightest touch will serve as signs by which the whole meaning of others will be anticipated, and will thus form the links by which conventional signs will be significant, as the light touches of the finger alphabet on the hands of each other are seen to be in all asylums for the blind. A full, effectual, and satisfactory medium of communi-

cation is thus facilitated by fellow feelings. Like functions are effected by like muscular adjustments, and like muscles have like muscular sense; so that a human being has, like the harp, chords which a friendly hand may sound from the lowest note to the top of their compass*.

* Dr. Marshall Hall's theory of re-transmission, by the spinal cord, of the sensational influence excited by impressions on the extremities of sentient nerves in the skin to the motor muscles and to the arteries of functional structures, bears no inapt analogy to the mechanical re-transmission of sound from impulse on the wires of a piano-forte, expressed by modified pressure on the keys.

ILLUSTRATIONS

OF THE

MUSCULAR SENSE IN THE BLIND AND DEAF.

THERE are many facts which have been ascertained with sufficient accuracy relative to the blind and the deaf, of which no satisfactory physiological explanation has yet come to my knowledge, nor do I think there were the requisite data for such an explanation previous to Sir Charles Bell's and Dr. Marshall Hall's discoveries of a muscular sense in every voluntary muscle, and a modified re-transmission, through the media of the brain and spinal cord, to excite the contractile energies of all the adjusting muscles of the several organs whose functions were required*. For example:—I wish to give broth to a

* Blood thrown on the brain by irritation of sympathetic sense is as regularly re-transmitted to put in action the adjusting muscles or arteries of the part, to perform a function.—*Vide p.* 13 *supra.*

patient who is comatose; but if I put it into his mouth before the muscles of deglutition are adjusted to swallow it, the broth may pass into his larynx, and endanger suffocation. If, however, his lips are gently rubbed with a spoon, both the muscles of the mouth and pharynx will be adjusted, and the food swallowed without risk. There are many instances in proof that vibrations produce definite adjustments.

There is one fact relative to the sensations of touch in every part of the skin which well deserves attentive notice. It is this: that we have no distinct sensation or perception of the object touched, except at the moments of contact and separation. If we let our hand remain unmoved on a table with which the ends of the fingers are in contact, we soon cease to be cognisant of the table, nor have we any sensation excited by it till we again move the hand. Must it not be inferred from this, that the sensation is in the muscular sense of the muscles moved?

That the working of all our functions are in the exact ratio of the adroitness of the adjustments by which they are effected, is well known to every artist who has marked the slow gradations by which his hands have acquired their cunning.

Most of the inferior animals have the adjustments their several natures may require instinctively provided for them. The locomotive and voluntary muscles of many young animals,—(the chick, the lamb, and the crocodile, are instances,)—are as accurately adjusted by their volitions a few hours after birth, as those of the heart and chest, which effect their adjustment for working their functions without the interference of the mind*. With the human race it is otherwise: we have to learn, by slow and irksome efforts, to adjust all our voluntary muscles—not only our limbs, but every organ of sense,

* Animals seem to have most of the mental powers that man has, but not having voice or hands, the instruments are wanting by which these mental faculties can be rendered so fully available. The carrier pigeon, the dog, and the cat removed from distant homes, must have retained distinct conceptions of them, to be enabled so unerringly to return.

before it is drilled to perform the functions assigned it. The senses of taste and smell are the first excited, and the adjustments of the nares, lips, and pharynx are promptly made for their gratification. But the awkward and ineffective movements of the infant's eyes and hands prove that their adjustments have to be learned by many ineffectual trials. In this preparatory school, provision is found, in the re-transmission of excitation, for the reciprocal influence of adjustments of the different organs of sense.

"One bright idea lighted in the breast,
By memory's magic lets in all the rest."

Moore's Lalla Rookh.

This is such, that when any object has been examined by two or more organs of sense at the same time, any one of them excited will recall all the rest. It is on this principle of our nature that, without being so aware of it, as to be able to state it in words, tokens are mutually given by parting friends,—lovers' locks of hair, decorations for deeds of arms, &c.

The ring given by Elizabeth to Essex, if not treacherously withheld, would probably, by "memory's magic," have recalled sentiments of tenderness that might have saved the life of that ill-fated nobleman*.

Both the continuance and recurrence at intervals of a sensation of light on the retina are analogous to sounds recurring as chords, and both seem not affections of nerves of sense, but of third adjustments, and explicable by Dr. Wollaston's alternate contractions and relaxations of different fibres of the same muscle.

With every re-transmission for functional adjustments, I think it will be found that there is a proportional arterial re-transmission of blood to sustain the sensibility and contractibility of the muscles employed: together with advancing the circulation of blood in the veins by mus-

* Professor Stewart thinks that when a child first hears a loud sound behind him, that he shows the idea of cause to be innate. May it not be more probable that the excited adjustments of the ear, linked by re-transmission in the brain, may rouse to activity those of the eye for search? This is a function instinctively performed, but not an innate idea.

cular pressure. Wherever more sensibility and contractibility is required, more blood is permanently or occasionally thrown into the part.

In sensation, the mind's perception is projected from the sensation in the muscular sense to the object, however distant —*e. g.*, heaving the lead, or firing at a bird.

The continuous but fluctuating circulation of the blood is analogous to the fluctuating air on the strings of an æolian harp—ever exciting functional adjustments. These, unaided by volition, are as varying as the motions of unadjusted eyes.

These premised considerations may, I trust, afford means to unravel much that has hitherto appeared intricate in all cases of defective senses. The infant has to learn to adjust his eyes before he can see distinctly. Thus, in the case of a boy under the care of Mr. Cheselden, who had never been capable of seeing till he was couched, he then, like the infant, had to learn to see distinctly by gradually

drilling to their office the muscles by which the eyes are adjusted for search. Hence also, at first, objects however distant appeared close to his eyes. Now it is competent to any person who will try, to put his own eyes in the unadjusted state of those of this newly-couched patient. If any one stands with unadjusted eyes before a distant lamp, a star, or the moon, so that the light may shine into them without his making any effort to see the lamp, &c., the light would appear to move in all the directions in which the ball of the eye is spontaneously moved by the restless contractions of its muscles. In this state he will have sensation of light, but no perception of a distant object. It is thus that a near object is often mistaken for a larger and distant one. Hence the necessity of search, before mere sensation of an object can be perfected to perception of the relation of its several parts. Two boys couched by Sir E. Home saw the models of triangles, squares, and balls put before them; but they could not recognise them

as such till they had looked at and counted the angles of the triangles, squares, &c. It was not till then that sight recalled their former sensations of touch. It was not till Mr. Cheselden's patient had so connected sight and touch by handling the cat while looking at her, that sight recalled his former sensations of touch, and he ever after discriminated by the reciprocal influence of these senses.

I would here suggest that we seem to have little more than nebulous sensations from the specific nerves of the different organs of sense; but that to have perceptive sensation of objects, the function of search must be put in action by volition*.

* Sir Charles Bell, in his Bridgewater Treatise on the Hand, with his accustomed clearness gives the following illustration of this function:—"Let us now see how essential this searching motion of the eye is to vision. On coming into a room, we see the whole side of it at once—the mirror, the pictures, the cornice, the chairs; but we are deceived: being unconscious of the motions of the eye, and that each object is rapidly, but successively, presented to it. It is easy to show, that if the eye were steady, vision would be quickly lost: that all these objects, which are distinct and brilliant, are so from the motion of the eye: that they would disappear if it were otherwise. For example, let us fix the eye on one point, a thing difficult

Up to the time when Dr. Howe had ascertained the amount of compensation which could be supplied to Laura Bridgeman by the cultivation of her muscular sense, the condition of one who had no sense but that of touch remaining by which it was possible to communicate with others, must have appeared irremediable.

But there are facts to prove, that the sense of touch is not limited to the ends of our fingers and our mouths, but is extended to every voluntarily-adjusting muscle in the animal body, since there is in each muscle a nerve by which the

to do, owing to the very disposition to motion in the eye; but by repeated attempts we may at length acquire the power of fixing the eye to a point. When we have done so, we shall find that the whole scene becomes more and more obscure, and finally vanishes. Let us fix the eye on the corner of the frame of the principal picture in the room. At first, every thing around it is distinct; in a very little time, however, the impression becomes weaker, objects appear dim, and then the eye has an almost incontrollable desire to wander; if this be resisted, the impressions of the figures in the picture first fade for a time, we see the gilded frame: but this also becomes dim. When we have thus far ascertained the fact, if we change the direction of the eye but ever so little, at once the whole scene will be again perfect before us."

slightest degree of contractile force is communicated and estimated by the perceptive mind.

It may appear paradoxical to those who have not given much attention to this subject even to suggest that our perceptive sensations by touch may be found rather in the muscular sense than in any specific nerve appropriated exclusively to that function.

But there are facts which render it probable, not only that the sense of touch, but that the specific nerves of all the other organs of sense, are indebted for their perceptive efficiency to the adjustments effected by the feeling of the muscular sense.

That this is a physiological fact, Sir Charles Bell's discoveries have, I think, afforded abundant proof. The following observation must have occurred to most persons who have made our sensational system a subject of their thoughts. We must look, listen, feel, &c. with adjusted organs of sense if we would have distinct perceptions of any objects presented to

the sight, hearing, or touch, and the relations they bear to each other, and still with more abiding adjustments if, in executing any work of art or playing a game of chess, we would ascertain with accuracy the relations which the objects before us bear to each other*. The value of such searching examinations by our organs of sense will be fully appreciated by any one who may have given his attention to the cross-examination of witnesses in a court of justice.

Of the necessity of muscular contractility not only to the muscular sense, but to give efficiency to all the specific senses, there cannot be stronger proof than that it is only while we feel that we can be said to touch; for mere contact of the fingers unmoved soon ceases to communicate sensation.

And so it is also with the eye and tongue; it is only at the moment of contact and separation of zinc and silver

* Let any one try to hum a tune inwardly; when he is conscious of having caught the air, he gives sound: the last is a stronger effort of adjustment than the first.

placed on some branches of the fifth pair of nerves, that a flash is seen, or heat or metallic taste felt on the tongue.

A sensible friend, whose hand, shattered by his gun, was amputated, has often told me that the sensations of touching, holding, and feeling with his fingers were perpetually recurring; but these sensations so referred to his fingers must have existed in the muscles remaining in his arm, and by which the fingers had been formerly moved*. This fact has an additional importance, as proving how our conceptions of objects or past sensations are vividly induced by the reiteration of the muscular adjustments which had been in activity while these sensations were occupying our attention. It is to this, probably, we may refer the long-enduring regrets kept up by often-recurring and vivid conceptions of departed friends. The fact is, that by far the larger portion

* This observation has been confirmed by similar effects experienced by intelligent officers who had lost a leg or an arm in military service. May we not infer from this that conceptions of objects are formed by muscular adjustments perceived by the muscular sense?

of our thinking life is occupied by analogous conceptive reiterations of past sensational adjustments,—a much larger portion than is occupied by substantial realities which first excited our conceptions.

Dr. Reid has said that we cannot recall sensations of touch by looking at an object familiar to that sense, although every one knows he can, with his eyes shut, recall visual conception of things seen by handling them. It is thus we seem to see the furniture of a room when we grope our way through it in the dark.

An old man who was blinded by smallpox in his eleventh year, has often told me that in feeling his way with his stick through the streets and alleys of Salisbury, he seemed to see them as vividly as if he had sight; and I cannot imagine how it would be possible for the blind to have memory and vivid conception of absent objects unless they could thus recall sensations of touch as readily as we recall objects of sight. In proof of this, Dr. Howe has observed that when Laura

Bridgeman dreams, she seems busily employed in talking with her fingers. So also her thoughts when awake are associated with her fingers; for if intensely engaged by herself, her fingers are observed moving, as it were soliloquising—showing a spontaneous connection between her thoughts and arbitrary signs*.

* It is generally supposed that the organ of touch is in the ends of our fingers. In the accompanying instances, it is clearly the muscular sense which gives the most accurate information of the relation of objects examined by touch, &c.

The following interesting additional particulars relating to Laura Bridgeman are derived from a work just published, entitled "*A Second Visit to the United States, in* 1845-6," by Sir C. LYELL, F.R.S.:—

"During our stay at Boston we visited the Perkins' Institution, or Asylum for the Blind, and found Laura Bridgeman, the girl who has been blind and deaf from infancy, much grown since we saw her four years ago. She is now sixteen, and looks very intelligent. She was reading when we entered, and we were told that formerly, when so engaged and alone, she used to make with one hand the signs of all the words which she felt out with the other, just as an illiterate beginner speaks aloud each sentence as he spells it. But the process of conveying the meaning of the words to her mind is now far too rapid for such delay, and the hand not occupied in reading remains motionless. We were afterwards delighted to watch her while she was following the conversation of two other dumb children, who were using the modern single-hand alphabet. She was able to comprehend all the ideas they were exchanging, and to overhear, as it were, every word they said [expressed], by

It is by the muscular sense that one perfect organ or manipulation may be substituted for another—a left hand for a right, the mouth for both, &c. That which soon is noticed, is the apparently increased excitability and accurate sensibility of such organs of sense as are not defective. The following fact seems to render it probable that the improved state of other senses is attributable to improved

making her fingers play, with fairy lightness, over theirs, with so slight a touch, as not in the least degree to interfere with the freedom of their motions. We saw her afterwards talk with Dr. Howe, with great rapidity and animation, pointing out accurately the places on a map while he gave her a lesson on geography." * * * * *

"We learnt from Dr. Howe that the task of carrying on her education has become more and more arduous, for she is naturally clever, and her reflective powers have unavoidably ripened much faster than the perceptive; so that at an age when other children would be satisfied to accumulate facts by the use of their eyes, her chief curiosity is directed to know the cause of things. In reading history, for example, where there is usually a continued description of wars and battles, she must be told the motives for which men slaughter each other, and is so distressed at their wickedness, that she can scarcely be induced to pursue the study." * * * * *

"Dr. Howe told us of a blind Frenchman in the establishment, who could guess the age of strangers, by hearing their voices, much more accurately than he and others who could see as well as talk with them."

accuracy of adjusting them to increased sensibility. When the hands and eyes are defective, the lips supply the assistance required. I have seen men with crippled arms write with their feet. Miss Biffin, without either legs or arms, held and directed both her pen and her brush with her lips. I have read of a woman who both read and printed with types felt by the lips only. I have seen a blind woman thread her needle with her tongue and lips. When a blind person hides any thing, and after some days goes to the place for what he left there, he must have conception by touch analogous to ours by sight—not by the nerve of touch, but by muscular sense. Does not this prove that we think (*i. e.* remember, get at the materials of thought) by adjustment?

A blind boy knew his companions by different sounds of tread, as the gravel on which we tread in the silence of night (and all hours are night to the blind) prates of our whereabouts. Blind horses know their exact position by sounds reverberated from a wall.

The blind have no other memory of pressure but muscular sense. I have observed the memory of the blind to be very retentive, since they are obliged to learn to "read, hear, mark, and inwardly digest," because they are dependant on others to recall their knowledge. The deaf are not so retentive, because they are less dependant on others, since they can both see and read *all* writing and print, and thus have the means of momentarily recalling what they desire to know. In like manner, persons living near objects of curiosity, and who feel that they can see them at any moment, are often less retentive of particulars than those who are visitors from a distance. Thus the blind mark the relative position and distances of objects so accurately, that they walk direct to the handle of a door, which we who have perfect sight cannot do when our eyes are closed.

To the blind and deaf, the muscular sense still remains; and it has been shown that it is by this apparatus and its function of adjusting the other organs of

sense, that all the mental conceptions which occupy the attention and form the thought of the thinking part of mankind are effected. Now the most marked difference between the blind and the deaf and others who see and hear is, that the latter pass rapidly from the sensational signs of things to the things (the external objects) which excited these sensational signs; whereas to the blind and the deaf these signs are more abiding objects of the mind's attention.

An instance within every one's power to notice may render this obscure part of the subject more readily apprehended. The larynx vibrates strongly with every letter we articulate, but not one in a thousand may have given such attention to the feeling it excites as ever to have noticed it. Yet it is by attention to these vibrations that young ladies are now taught to sing, and the dumb to speak.

Now analogous vibrations, however excited, induce definite adjustments for effecting the functions of the part the action of which is required. The definite

figures formed by vibrations of dust on a surface of glass or water, and of definite measures on musical strings and instruments must be familiar to all. So the vibrations excited on a road enable Indians to be aware of the tread of an enemy, and the thrill of rhythm of music is thus often so communicated from the floor to the adjusting muscles of the limbs, that the deaf can dance to the measure as observant of the time as those who hear.

A deaf gardener with his ear on the ground could distinguish the steps of any member of the family he was serving.

We may put our fingers on the larynx and feel the vibrations when we speak, but cannot so interpret these vibrations as Wadham* does when he speaks; for he, by studious direction of his mind to the muscular sense in the larynx, feels the vibrations, and interprets their meaning by mind alone, without the aid of fingers.

Wadham not being able to interpret

* The individual here alluded to was for ten years a teacher at the Asylum for the Deaf and Dumb in the Kent Road—being himself entirely deaf and dumb.

the meaning of those sounds of the human voice he might hear, with his new ear-trumpet (*i.e.* the eye), interpreted the words seen, written, or printed; but the ear and the eye had not been so associated as to interpret each other.

Beethoven and Saunderson had lost nothing but colour and sound in their sciences. Of the relative and definite proportions, they still could calculate as well as those who see and hear.

Giovanni Cionilli totally lost his sight during the siege of Mantua, in 1630; but he still contrived to sculpture busts, his hands doing the office of his eyes. He even sculptured the portrait of a young woman with whom he had been in love before losing his sight:—

> "Sculptured by love, Eliza's portrait view,
> Tho' blind the artist, yet the work is true."

Does not this prove that our conceptions are, equally with our sensations and actions, formed physiologically by our adjustments?

If when we steadily fix our eyes on any well-defined object, and then close them, we for some seconds seem still to see what we had been looking at, and continue to do so as long as the adjusting muscles retain a steady tension. It is by such abiding adjustments of the muscles moving the eyes that the painter is enabled to transfer to his canvass the exact lineaments of the face he is trying to perpetuate.

A very sensible deaf painter told me that he had exquisite pleasure from feelings of rhythm excited by vibrations of all he was in contact with when near a military band, and that when for the first time he used a good ear trumpet, this pleasure was much increased; but he thought he should be disappointed if he could hear people talk, as he should have no means of interpreting the sounds. A little reflection will enable us to perceive the reasonableness of this anticipation.

I had read French with facility before my first visit to Paris, but was much disappointed when I found that I could not,

in the theatre, distinguish any articulate words, so as to glean their meaning. But, with a book of the play before my eyes, the sounds and words so associated as to enable me to hear the words spoken most distinctly, and thus to interpret them by my eyes.

The words of a chant in a Cathedral are seldom distinctly heard, unless they are at the same time seen in the Prayer-book or recognised by the memory. When I saw the words of a chant which I could not distinguish by my ears, the adjustment of my eyes so regulated that of my ears, as to enable me at once to recognise articulate sounds. Now sounds (infinitely varied as they are in music or speech) are but effects of slight pulsatory touches of the air on the very limited surface of the tympanum. This, well thought on, tends to reduce our surprise at the rapidity, with which such an infinite variety of meanings should, on Laura, and other deaf and dumb persons, by touches so slight in passing, or by hands held in each other, induce thoughts corresponding

with the thoughts of those who thus had pressed them*.

Sir Charles Bell, in his work on Expression, (more pregnant with correct thinking than any book I could cite,) refers the mysterious link of fellow-feeling to the circulation of the blood. This subject is so pleasingly, and yet so philosopically, developed by Sir Charles, that I am sure it will be more satisfactory to you to re-peruse his clear statement of facts; and their application to the excitement, through this medium, of social sentiments and emotions in the blind and the deaf will immediately occur, suggested as it is sure to be to all persons who have had free intercourse with society.

The experiments published by Sir H. Davy, in his Essay on the Nitrous Oxide Gas, afford satisfactory evidence that the

* If we enter a street at a different point from which we had before formed an idea of it, all our notions are so reversed that perplexity is induced. Here, as in insanity, we have different adjustments. (*Vide* LOCKE.) Hence our difficulty in the dark—our adjustments not being adapted to the situations of things. This seems to bear some analogy to seeing and hearing a chant.

sense of touch exists in the muscular sense to be traced by the anatomist in every muscle of the body. I quote his own report of his feelings while breathing that gas:—"A thrilling, extending from the chest to the extremities, was almost immediately produced. I felt a sense of tangible extension, highly pleasurable, in every limb; my visible impressions were dazzling and apparently magnified: I heard distinctly every sound in the room, and was perfectly aware of my situation. Trains of vivid visible images rapidly passed through my mind, and were connected with words in such a manner as to produce perceptions perfectly novel." That these mental phenomena were produced by the circulating blood modified by its affinity with the gas during its passage through the lungs, is proved by his observation in a note, that "his cheeks became purple."

If a pair of compasses be opened about half of an inch, and their points put towards the lips, an analogous feeling of extension may be noticed much wider

than the sight or touch of the points by the fingers could have led one to expect. These feelings, with those of increased sensibility of seeing and hearing, appear to me to warrant the inference, that sensibility is in ratio of the minute circulation in the part.

A blind boy in the Asylum of York, whose sense of tactile touch was not sufficiently delicate to enable him to feel the slight deviations or depressions constituting the forms and characters of the embossed words which he was to read by touch, blistered the ends of his fingers; and when he had thus removed the cuticle thickened by hard work, insured a quicker circulation of arterial blood in the minute arteries, the sensation of an organ of sense being directly in ratio of such minute circulation, of which the lips are the most obvious example.

Beethoven washed his hands to insure complete freedom from compression to the sensitive nerves of touch, and to give access to oxygen, as there is diminished sensibility in the skin, eyes, tongue, &c.,

when moisture is not present—analogous to salts, whose affinities do not act but when their atoms are separated by moisture.

All instructors of the deaf or the blind have observed that their task is much facilitated if light and sound are remembered to have been felt or can still make impressions, however faint and indistinct. By so doing they excite proportionate adjustments in the ears and eyes, and these, however imperfect, aid those unfortunates to interpret the communication addressed to them by touch.

This solves the problem how some persons newly couched recognise by the eye objects long known by the touch, and why others do not. For when any two of our senses have been impressed by the same object at one and the same time, the sensations reciprocally recall each other. This is analogous to the words of one language imperfectly known to us, and which we have to interpret by one already well known to us.

In the different Asylums of Cork,

Dublin, Liverpool, Birmingham, and London, I found not one in twenty but who could distinguish light from darkness, and hear the sound from a poker swung from the ears. What they had seen or heard before they became blind or deaf, they dreamed of and could voluntarily recall. All these patients distinctly saw the flash from zinc and silver, put between the cheeks and the gums, and were delighted, repeating the experiment with eagerness in groups.

Those who never saw have no memory or dreams of light, but can recall and dream of what they had felt. This fact is opposed to Dr. Reid's opinion. Both blind basket-weavers and rope-makers told me they could recall the sensation of touch*.

* We who see, pass from the sensation impressed by touch to the objects, of which the sensation is but the telegraphic sign to the perceiving mind. But the attention of the blind is limited to the sensation alone, (unless they had seen long enough to form visual conceptions before they became blind,) and therefore must have the power of recalling tactile conception, though we, who see, may not have;—or how, but by conception of past touches, can they recognise objects and places, to which they walk as confidingly as those who see?—

The son of a physician in London, who was blind till his eighteenth year from cataract, and was then relieved by couching, in his dreams while blind felt persons and heard their voices, but never saw them; but after he was couched, *saw* persons in his dreams.

Patients deaf while sane become quick of hearing while insane, (from inflammation rendering the brain excitable) and deaf again on recovery. The mad, when cured, remember what happened while they were confined; but Mr. C——, the painter of Sovereigns, had to learn his art again when he recovered from an attack of insanity, having forgotten even to draw.

That the adjustments necessary to render visual sensations distinct are abiding long after the objects looked at have been withdrawn, is known to every one who is in the habit of continued attention to minute objects. It is also well known that the conceptions while under the influence of strong emotions (as in cases of sleep walking and talking) are equally abiding; and as the adjustments of lips and limbs are in motion during such dreams, may it not be inferred that the conception from which the motor influence was re-transmitted, was likewise formed by adjustments? That Laura Bridgeman's conceptions are formed by adjusting muscles, seems to be indubitable, as her finger-talk is often observable while she is sleeping.

EDUCATION OF THE BLIND AND DEAF.

Can adequate notions of the attributes of Deity be given to the Blind and Deaf? I think they may, and by extending their notions (even of a stick and a plate) to the most distant limit they can imagine; and then by the *reductio ad absurdum*, the question as to what prevents their thoughts from still pressing onwards beyond that and every sequent limit, they can propose to themselves. A like process of thought will give as adequate a notion of time, omnipresence, omnipotence, benevolence, &c., as any one with the most perfect senses can form. A handful of pebbles compared with a handful of sand may aid the conception of numbers extended to infinity. To some, the conception of walks more or less extended may, by due consideration, be extended to infinity—as days to eternity.*

* The late Dr. Beattie left his son without any religious instruction till his sixth year. He then sowed mustard and

Caresses are signs of kindness instinctively interpreted by our fellow feelings —blows and repulsive pushes from any one are signs of unkindness.

I have known deaf children to join in a Christmas dance with the servants of a large family, and dance correctly. When questioned how they could dance so well, they replied that they felt the vibrations from the floor all up their legs, and vibrations are now well known to induce adjustments in ratio of the structures they excite to motion. This may be seen in the forms assumed by any light powder spread on a plate of glass, or on the surface of water in a finger-glass, and made to vibrate by drawing a violin-bow over the edge of the glass*.

But how is it that the deaf and dumb

cress in the boy's garden, in the form of his name; and excited his astonishment by showing that his name had grown where the earth was bare only a week before. From this instance of design, the inference of an Intelligent Cause was easy and impressive even on the mind of a child.

* If water is cooled to some degrees below the freezing point, and then struck, so as to be made to vibrate, the water instantly freezes, and its particles become adjusted to angles of 60 degs. An analogous and perhaps more satisfactory experiment may

have more intelligence than dogs, elephants or monkeys, if it be true (as Mr. Locke contends) that all our knowledge has access to the brain and mind through the organs of sense? The fact is, that no one in Locke's time was aware of the innumerable intimations afforded by the muscular sense, during the manipulation of search, and the muscular adjustments for speaking and hearing. This muscular sense is worth all our other senses, as it is this which gives efficiency to all the other senses. But it is to the brain that we are chiefly indebted for human superiority, since it is by this that all our sensations are modified, and through its medium that they are perceived, and a motor influence re-transmitted*. A case

be shown, by letting a saturated solution of Epsom salts stand till cold, and then by exciting vibration in the bottle that contains it.

* A man who had a musical ear, and who was thought to sing and whistle well, had his right parietal bone fractured; after which, he lost all musical power, and on attempting to sing the most familiar air, he could not get over a single bar, but became confused, and struck into two or three different tunes. He recognised any music that he had previously heard, but was quite incapable of singing it himself, or of acquiring

is related by Dr. Yellowby, of a woman whose arms were partially paralysed (by ancesthesia), and she could not hold her child if but for a moment she looked at any thing else. The physiological explanation of this case may be the following :—By looking at her hand and the child, a visual conception was formed, and from this, the re-transmitted motor influence, which excited the muscles of her arms and hands to prehensive contraction.

LAWS OF NATURE.

In and by these laws, we live and move, and have our being; and are never better employed than in investigating them, and so disposing ourselves and the things needful to us, as to have their co-operation. We do this when we sail, apply the power of steam, manufacture, cultivate

anything new, as before. It has been observed by all who have attended convalescents from congestive apoplexy, that their memory forwards is so impaired, that they substitute words of a different meaning for those they would have used before their illness.

the earth, or pursue processes in natural philosophy or chemistry: but few men act as if they were aware that their well-being equally requires a like scrupulously accurate attention to the physical and moral laws of our nature. A knowledge of the laws of nature is essential to a right performance of our duty, to our health, and consequently to longevity.

If I am not mistaken, the innate principle (not innate idea) of primeval equality,—the desire, the demand for consideration from others,—(*"ut non omnis perear,"*) is even stronger in the feelings of the blind and deaf, than in others who can see and hear what is going on around them. "A sacred principle this," says De Lolme*, "which neither injustice nor ambition can erase, which exists in every breast, and to exert itself requires only to be awakened among the numerous and oppressed classes of mankind."

* Constitution of England, p. 23.

IDEA OF IDENTITY—HOW GOT BY THE BLIND.

How is the identity of persons, places, and objects with which they are familiar recognised by the blind?

All who see and hear, so far as I can judge of others by what I have observed in myself, decide on identity by comparing what they see and hear with the abiding conceptions of what they had heard or seen before. And, that identity is guaranteed by conception is proved by portraits and busts of the absent or dead, executed from memory, by painters or sculptors who had loved them when present or living; and which are recognised by those who had known the originals to have a more striking resemblance than portraits and busts taken by artists in a few listless sittings, during which the countenance had not been animated with the ever-varying expression observed in domestic life. And that the conceptions preserved in the enduring

affections of the blind are equally vivid and faithful, is proved by the remarkable instance of the blind Italian sculptor referred to at page 50.

HOW THE DEAF AND BLIND GET THE IDEA OF CAUSE AND EFFECT.

NOT INNATE, BUT FROM SENSATIONS. OUTNESS—DISTINCTION BETWEEN SENSATION AND PERCEPTION.

Cause has been supposed by some to be an idea born with us, and not suggested by the external or muscular organs of sense. In the case of Gill, the deaf and blind woman living with her relations at Gosport, we have a proof that her idea of cause must have been excited by associated ideas which she had through the medium of sensation. Having a keen relish for apples and other fruits, she was angry when money given her and left on a shelf had not been removed, and fruit brought to her in its stead. The two

ideas had been associated in her mind as antecedent and consequent, as cause and effect. The money excited in her memory a vivid conception of what had before gratified her palate. Here the money was the cause of the conception of apples, and this conception was the exciter of her appetite. Hence her anger that the money (still left on the shelf) had not, as a cause, produced the apples, by which she remembered that her appetite had before been gratified. Here then we distinctly trace in our corporeal functions the origin of ideas which some thinking men still believe to be innate, and which Mr. Hume thought neither had been nor could be satisfactorily traced to sensational impressions.

With the idea of *cause* in this case of the woman Gill, must also have come that of OUTNESS, as she must have felt her utter inability to procure for herself the gratification of her desires by mere volition. This consideration of OUTNESS, or the reference or *projection* of the conceptions of the mind to something ex-

ternal to the mind itself, enables us to understand clearly the distinction between sensation and perception, two functions which are often confounded.

The conceptions of persons who see and hear seem to be perceived as if projected to the place at which the sensational impressions were excited, and to be seen and heard there. The familiar examples before adduced—that of the seaman heaving the lead, and the rumble of a coach heard on a distant road,—are cases in point. The perceptive mind passes the sensation unheeded, and all its perceptive attention is fixed on the object, as sought for in the place from which the impression proceeded*. Thus the deaf

* May we not from this infer that we have no *direct* perception of objects external to the organs of sense, "by whose adjustments our conceptions are formed?" If any one will carefully fix his attention on the real object of his perception, while devising and contriving somewhat he has to arrange, I think he will be satisfied that it is not the objects themselves, but his conceptions of them, and of the relations which they bear to each other, that he seems to see;—that is, to perceive his own conceptions, and how they should be arranged,—as the flower beds in a garden, or the rooms and furniture in a house.

and blind seem to perceive a conception at the end of their fingers; and the ordinary expression we employ, when we say of a blind man that he *feels his way* with his stick, significantly intimates that the perceptive act of his mind is directed to the pavement or path, and not to the actual sensation produced by the contact of his hand with the stick. In general, we may satisfy ourselves by attention to our sensations, that any impression thus communicated to the perceptive mind through the media of the nerves and brain, excites a conception which is not perceived as in the brain, but as if projected to the place from which the sensational impression had proceeded.

In our mental search to ascertain how thoughts are formed,—how the art of thinking is effected,—I am not aware of any thing more deserving attention than the spontaneous projection of conceptions, and our perception of them in the place from which the impressions or

sounds, which excited the conceptions, seem to come. When the meaning of others is to be interpreted from impressions made on any of our senses, the conceptions excited by expressive touch are projected to homologous parts, and interpreted by the feelings which they there excite.

May not this re-transmission of motor influence to homologous parts, be explanatory of imitation, memory, &c.?

CAN THE BLIND AND DEAF FEEL THE INFLUENCE OF BEAUTY.

"Whilst in the dark on thy soft hand I hung,
And heard th' enchanting syren in thy tongue,
What flames, what darts, what anguish I endured!
But when the candle entered I was cured."

But the blind are always in the dark: still the pleasures excited by conceptions in the remaining senses is beauty to them; —pleasures which they feel more exquisitely than those who see, as their undistracted attention is fixed on the most

evanescant changes in all their feelings. The vibrations in the larynx, always felt by the speaking blind, requires a forced and deliberate attention to be felt by others.

The blind cannot feel the influence of such beauty as results from complexion, and the expression resulting from its rapid changes of motion and colour,—from paleness to a blush, &c. As little can they appreciate

"Th' expressive glance whose subtile comment draws
Entranced attention and a mute applause."

But the gesture of the character even in a play he might appreciate from his own muscular sense of motor re-transmissions consequent on the emotion excited by the story of the drama.

Of the contour and symmetry of a face, his fingers, sensitive of the impression from the finest textures of moss, and of such unevennesses of surfaces as mark the counterfeit medal from the real, may enable the blind to judge; for of all this we know that the mind may be cognizant,

as Professor Saunderson and others have been sensitive of such slight impressions. The *fi donc!* of a blind lady while feeling the face of Mr. Gibbon, is a well-known story, in proof that at least the negation of beauty may be ascertained by touch.

FELLOW FEELING.

LIKE parts have like structures, formed by like tissues; like tissues have like excitabilities; and like nerves and muscles have like re-transmissions, and like functions.

Sensitive parts have re-transmission from the spinal cord, unless abnormally excited—as by stimulating food, congestion of morbid secretions, or respiration of nitrous oxyde gas; after which latter, Sir Humphrey Davy said he had sensation of extended vibrations of touch. As sensibility is in the direct ratio of the quantity, velocity and quality of the blood

circulating through its minute arteries, parts are most sensitive of pain when inflamed, but at the same time have less of perceptive and discriminating sensation of exciting objects.

Fellow feeling is therefore most intense between two persons of like age, structure, temperament, and condition of mind, body, and estate;—as watches made alike go alike, and musical instruments, if made equally well and of like materials, reciprocally excite musical vibrations in each other.

The physiological process may be the following,—at least between a Romeo and a Juliet: an expressive look, a kind word, a caressing touch, excites attention, and adjustments of the eyes and ears for searching the meaning of the expression. A conception is then formed, and from that issues a re-transmission of motor influence to the part homologous to that from which the exciting expression has proceeded. But, as has been said, parts made alike feel alike, by like muscular

sense, if in like conditions of health and temperature*.

Here let us pause. The materials (sensation, conceptions, &c.), and the apparatus with which we Think have been stated; but still the physiology of Thinking remains obscure. Much of Thinking is effected by the functions of different organs of the body (by adjustments, re-transmis-

* If one hand be held in hot water for half a minute while the other is in cold water, and they are then taken out, and dipped into a mixture of the two waters, the hand that had been in the hot water will feel cold, while that which had been in the cold water will feel warm. Now such as is the difference in two hands whose conditions are different, such will be the difference between persons of different make and temperament, and the resemblance or dissimilitude of the conceptions excited. If resembling, they will think alike,—see objects and events in the same light,—and have like wishes. As the blind and deaf are, and must be, more attentive to the slightest sensation than others who see and hear,—and this from their intense curiosity to interpret the meaning of all impressions on their senses,—and, as with the motor influence, projected to the adjusting muscles of the homologous part, there is also like re-transmission to their arteries, giving more exquisite sensibility,—this may account for the quick interpretation by the blind and deaf of impressions which escape the observation of those who see and hear.

A like explanation may apply to the quick and sure interpretation of the most evanescent signs of intelligence betwixt lovers, and men of the same party or sect.

sions, &c.) The changes effected by these are perceived by animals as by man; still, the mere perception of these subjective changes of our sensations and the instinctive inferences from them to those objective causes of the impressions by which subjective sensations are occasioned is not thinking. Our conceptions, whether excited by external or internal impressions, are not thinking. Neither is memory, which is merely a succession of conceptions, which we cannot recall when we most wish to have them, nor prevent their recurrence when our comfort depends on their absence*. Such conceptions pass

* But ever and anon of griefs subdued
There comes a token like a scorpion's sting,
Scarce seen, but with fresh bitterness imbued;
And slight withal may be the things which bring
Back on the heart the weight which it would fling
Aside for ever: it may be a sound—
A tone of music,—summer's eve—or spring,
A flower—the wind—the ocean—which shall wound,
Striking the electric chain wherewith we are darkly bound;

And how and why we know not, nor can trace
Home to its cloud this lightning of the mind,
But feel the shock renew'd, nor can efface
The blight and blackening which it leaves behind,

and re-pass* the mind's perception of them so evanescently, like dissolving views, as to elude the scrutiny of the most concentrated attention.

> "Like seeking life in creatures we dissect,
> We lose it at the moment we detect."

We may talk and walk while asleep, as thick-coming fancies excite a motor influence in our members. Volitions, often carelessly repeated, become habits as difficult to control as ordinary retransmission by the most urgent motives suggested by reason. It is not the mere perception of relation of objects, or our own conceptions of them which constitutes Thinking; but the voluntary modification and DIGESTION of them, as when a DIGEST† or code of laws is composed, when a Handel or a

> Which out of things familiar, undesign'd,
> When least we deem of such, calls up to view
> The spectres whom no exorcism can bind,
> The cold—the changed—perchance the dead—anew,
> The mourn'd, the loved, the lost—too many!—yet how few!
>
> BYRON.

* "Come like shadows, so depart."—SHAKSPERE.

† "Mark, learn, and inwardly DIGEST."—*2nd Coll. in Advent.*

Haydn contrive some soul-subduing harmony, or Shakspere produces such cunningly-contrived relations of situations and persons, scenes and events, as by their illusive effects to pass on an audience for realities, as to excite like fellow feelings, and for the moment unite the most varied minds by like expressions, and by such "touches of Nature as make the whole world akin."

Again, for it is so intricate a subject, one can adduce hardly too many instances. When the place of an unseen planet is inferred and calculated, as of Neptune, from disturbed movements in the planet Herschell; or an electro-magnetic telegraph contrived by a Wheatstone, or the conduct of any domestic or national affair adapted to promote the happiness of the parties concerned*. But such results of thinking must have required antecedent knowledge, and "Knowledge is power," and power implies force.

But the vitality of the body co-operating with mind, for "Lips *is* parcel of the

* Franklin.

mind, vitality of nerves, and muscles and blood vessels, the scene shifters, the builders and repairers of the body—the theatre and instrument of mind.

Of our INSTINCTS vitality is perhaps, the chief agent, and is therefore a force.

ABSTRACT OF A PAPER READ BY DR. FOWLER TO THE BRITISH ASSOCIATION AT BIRMINGHAM, 1849.

If Vitality be a Force having Correlations with the Forces, Chemical Affinities, Motion, Heat, Light, Electricity, Magnetism, Gravity, so ably shown by Professor Grove to be modifications of one and the same Force?

The author, after having shown that each of these modified forces can be excited by any other, or in its turn be the exciter of all the rest, and consequently the antecedent or consequent indifferently of each of the others, proceeded to show that this is equally true of vitality, and that the coils in which these forces are

latent, and by whose modifications in an excited state they are rendered apparent to our senses, constitute one of the differences between them. For instance, the change of temperature to which the infant is necessarily exposed at its birth, the heat going rapidly out of it, excites the motion necessary for inspiration. This gives the oxygen of the air access to the carbon of the blood by endosmosis; this again to animal heat. From that electricity may be obtained; and from electricity, by an appropriate coil, magnetism. Gravity the infant acquires by its growth, and can counteract by its muscular contractility. It may be said that an infant affords no evidence of the production of the forces, light, electricity and magnetism, but the experiments of Dr. Faraday have demonstrated that all these may be produced by the vitality of the Gymnotus, and rendered palpable to our sight and feeling. So much for the qualities by which vitality has correlations with all other forces. But there still remains a difference—vitality is the artist of its own *coils*. No other force

can make an organ of either an animal or a plant (the coil by means of which their vitality is evinced). Neither a Volta nor an Œrsted could have invented an eye or an ear, or even a graft by which the sap of a fruit-tree is so modified as to differ from that of the parent stock.

The author added instances of the light of fire-flies, glow-worms, and some marine animals, as instances of production of light, apparent to the vision of others by vitality. And any person may satisfy himself of the ease with which a flash of light, the products of his own vitality, may be rendered perceptible to himself, by putting a plate of zinc between the gums and the cheek in one side of the mouth and the broad handle of a silver spoon in the other, and then (in the dark) he will see a flash of light at every instant of contact and separation of the zinc and silver.

That mind and vitality reciprocally excite and depress each other must be obvious to all who are attentive to their daily feelings; and all conversant with surgical practice must be aware of the

difference in healing of wounds in a healthy or exhausted subject.

What then are the laws of mind, vitality, and their common mortal coil? The coil is the instrument of a force, and no coil of physical forces can effect two functions by one continued or fixed adjustment, and, analogous to the coils of physical forces, the mental and vital coil, the body, cannot effect two functions by one continued or fixed adjustment. If a finger and the mullion of a window are looked at with one adjustment of eyes, the perception of both is imperfect, if we look at one, the other is seen as double. If we look at the moon with unadjusted eyes, a lamp, or star, they seem to wander or move.

ANALOGIES OF MIND FORCES WITH PHYSICAL FORCES.

All act through the media of coil, adjustable for any purpose intended. When there

is an appropriate coil, the force is no longer latent, but cognisable by some one of our senses. Gravitation, by the barometer, to our eyes; and, by the steelyard, to our sense of feeling. Our muscular sense of Gravity is most appreciated the further we ascend above or descend below the surface of the sea. Motion is best appreciated by our muscular sense on horseback, or in a swing. Of our sensation of other physical forces by means of appropriate coil instances are sufficiently obvious.

The difference in the effects of a force entering or leaving its coil, as in the instances of gravity while we are swinging, or in a ship pitching in a storm,—heat and cold,—going suddenly from a very bright to a very dark place, must have been felt by all.

When all the coil (organs) of the body, our mortal coil, are in health and adjustable for their several functions, the mental and vital forces are efficiently and appreciably in action; but when their coils are unadjusted and deranged by insanity, intoxication, or disease, the forces of mind

and vitality are obstructed. When the coil is restored to sobriety and health, both mind and vitality reappear in their normal state of activity. Now, may not the GREAT SOURCE of our present coil resuscitate our consciousness of individuality in another coil adapted to a more advanced state of existence?—this hope is supported by the consideration that the coil of the boy is more perfect than that of the infant, and that of the man than that of the boy—that even the man's coil is often improved by his mind, and repaired by mind when impaired by disease*.

* Mind force latent while its coil is deranged by disease, re-appears when this is again restored to health—

"See the wretch that long has tost
On the thorny bed of pain,
At length repair his vigour lost,
And breathe and walk again.
The meanest flow'ret of the vale,
The simplest note that swells the gale,
The common sun, the air, the skies,
To him are opening Paradise."

"Homines ad Deos, nulla re propius accedunt quam salutem hominibus dando."

Is not suspended consciousness, even sleep, temporary death?*

If life is not to be renewed, for what purpose have we lived?

For what purpose have we lived? None of the lower animals seem to act without a purpose, but in them the purpose is suggested by some animal instinct. Man's purposes are suggested by his instincts; but man's purposes are suggested not only by his animal but by his mental instincts. Of these, the desire of consideration is perhaps the most urgent—it is sought even at the cannon's mouth†.

Something of this desire of consideration is observed in elephants, dogs, and horses—

"The generous steed, you pompously bestride,
Shares with his lord the pleasure and the pride."

* "Sic sine vita vivere,
Heu quam dulce est sic sine morte mori."

"We are such stuff
As dreams are made of, and our little lives (days)
Are rounded with a sleep."

"Sleep, the death of each day's life."

MACBETH, Act 2, sc. 2.

† "I Demens curriper Alpes, pueris ut placias, et declamatio fias."

There is, however, this difference: The man's purpose operates with a force to induce him to incur hardships and privations to attain it*. In animals the purpose suggested by appetite prevails over that suggested by mind.

But is it likely that while man and even brutes are actuated by an intelligible purpose, that their CREATOR should have had no purpose for which he created them? And may not this purpose be that, as in a school†, man should acquire

* "Qui cupit ante alios optatam contingere metam multa tulit fecit que puer," &c.

† The best discipline for the mind for benevolence and self-control seems to have been that of the Stoics—

"Hi mores, hæc duri inmota Catonis
Secta fuit servare modum, finemque tenere,
Naturamque sequi, patriæque impendere vitam;
Nec sibi, sed toto genitum se credere mundo.
Huic epulæ, vicisse famem: magnique penates,
Submovisse hyemem tecto: pretiosaque vestis,
Hirtam membra super Romani more Quiritis
Induxisse togam: Venerisque huic maximus usus,
Progenies; urbi pater est, urbique maritus:
Justitiæ custos, rigidi servator honesti:
In commune bonus: nullosque Catonis in actus
Subrepsit, partemque tulit sibi nata voluptas."

LUCAN.

such self-control, benevolence, and intelligence as may fit him for a future and more advanced state of existence?

INSTINCT—ON THINKING.

MAN'S INSTINCTS, ever urging him to search for the objects of his wants and appetites (and every function, whether of body or of mind, has an appetite, limited by the structure of its organ), act a more important part than most of us are aware of in the thinking process. Of this Lord Bacon was well aware when he wrote—"Dimidium est scientiæ pertinens interrogatio"—for interrogation is prompted by curiosity, and curiosity is an instinct. On this subject the author read a paper to the British Association, at Edinburgh, in 1850, of which the following is an abstract :—

Of the Influences of Man's Instinct on his Intellectual and Moral Powers, i. e., *his Mental Functions.*

The body of an animal is the mortal coil, or rather a congeries of coils, through which its vital

and mental forces act. Each of these coils has an instinctive appetite for its appropriate object, the wants, appetites, emotions and passions, both of man and animals inferior to man, though instinctive or susceptible of control by the mind, and subject to the direct influence of the physical forces, gravitation, motion, chemical affinities, heat, light, electricity, and magnetism.

Now the most marked difference between man and other animals seems to be, that man has to contrive the means by which his ends are to be attained, whereas to animals the means of gratifying their instincts, wants, or appetites are instinctive. The spider requires no previous teaching to weave its web, and the Chinese fish (see 'Bell on the Hand') with unerring aim brings down a fly from some feet in the air with a drop of the water in which it swims. Shells, scales, fur, and feathers defend them from the elements, and more perceptive organs of sense are given to all for detection and pursuit of their prey. Man, urged by his wants to devise means for their gratification, is thus schooled and impelled to the cultivation and progressive improvement of both his intellectual and moral faculties, for the obstacles to be removed force on him the control of his own propensities and the conciliation of the aid of his fellow man. Our wants therefore may not be considered an evil, but rather as the Pertinens Interrogatio, suggesting search, and are thus the sources of all the arts and of a large portion of the

sciences by which human life is gladdened, sustained, and informed.

The author shortly adverted to Outness, or the instinctive belief that all the objects with which we are surrounded are separated from us by apparent distances in space, while it is now known that this belief is not more than an instinctive inference (sustained indeed by concurrence of periodical returns of phænomena at the exact times calculated and perspective sketches of objects at different distances) from subjective sensation ; for even of the forces by which all changes in objects and their relations to each other are affected, the mind has no very direct perception ; that this is really so, light and heat may be adduced as instances.

Of the travellers who meet at the half-way hut on the Andes, those who have descended feel over-heated, while those who are ascending complain of cold, though the actual temperature, as measured by the thermometer, is the same to both parties.

Analogous to this is light, as it is seen by persons in the passages to and from a diorama.

The hand that has been in hot water feels cold, while the other just out of cold water feels warm, when both are dipped into the mixture of the hot and cold water.

Again, all the physical forces are felt as different while passing in or out of our bodies, for instance, gravitation and motion, while ascending or de-

scending in a swing; of heat and light, the instances given above may suffice. The operations of a surgeon inflict like wounds, whether pure air or chloroform has been respired; but how different to the feelings of the patient are these changes of the chemical affinities when continued or obstructed; buoyancy when pure air has access to the blood, faintness when chloroform is substituted! Is it not then demonstrable that what is perceived by the mind directly is not the objective excitors, but the subjective effects, notwithstanding our instinctive belief of the contrary?

On the still debatable subject of innate ideas, the author doubted whether we have any other than the mind's perception of our functional appetites in the various organs of the body (accompanied as they are with corresponding changes in the passage of the blood through the heart), and of the impressions made by the physical forces incessantly exciting all our sensational structures; hence every antecedent sensation is intuitively inferred to be the cause of the propensity felt for any action or object of desire, present or absent; for to be doing, in order to acquire something, is an incessant propensity in all animals.

Is it not at least probable, therefore, that the actions of both man and the inferior animals, which are designated as instincts, may be referable to mind, limited in its

action by the structure of the organs of the body, through which it acts? For this view of the subject seems to derive some sanction from the following considerations: That actions, at first voluntary, gradually become habits by frequent repetition, and as difficult to control as the most urgent of our instincts—drinking, gaming, indulging in smoking, chewing, and snuffing tobacco, &c., so that habit becomes proverbially a second nature, or instinct.

EXPRESSIONS RETRANSMITTED FROM CONCEPTIONS TO ADJUSTING MUSCLES.

THE sleeping gipsy, described by the Hon. Mrs. Norton, in her "Child of the Isles," is a most impressive instance of involuntary expression by voice, feature, and gesture, while sleeping.

Dr. Howe observed, that Laura Bridgeman often was seen finger-talking in her sleep; and I have heard from persons who

had seen and heard others while sleeping return rational answers to questions.

IF CONCEPTIONS AND ADJUSTMENTS ARE CORRELATIVE?

Campanella (as quoted by Mr. Burke, part iv. sec. 4, on the efficient cause of the sublime), could, by mimicking the looks and gestures, penetrate into the inclinations of those he had to deal with: he composed his face, his gesture, and his whole body, as nearly as he could into the exact similitude of the person he intended to examine; and then carefully observed what turn of mind he seemed to acquire by this change. So that, says my author, he was able to enter into the dispositions and thoughts of people as effectually as if he had been changed into the very men. I have often observed, that on mimicking the looks and gestures of angry, or placid, or frighted, or daring men, I have involuntarily found my mind turned to that

passion, whose appearance I endeavoured to imitate; nay, I am convinced it is hard to avoid it, though one strove to separate the passion from its correspondent gestures. Our minds and bodies are so closely and intimately connected, that one is incapable of pain or pleasure without the other. Campanella, of whom we have been speaking, could so abstract his attention from any sufferings of his body, that he was able to endure the rack itself without much pain; and in lesser pains every body must have observed, that when we can employ our attention on any thing else, the pain has been for a time suspended: on the other hand, if by any means the body is indisposed to perform such gestures, or to be stimulated into such emotions as any passion usually produces in it, that passion itself never can arise, though its cause should be never so strongly in action; though it should be merely mental, and immediately affecting none of the senses. As an opiate, or spirituous liquors, shall suspend the operation of grief, or fear, or anger, in spite

of all our efforts to the contrary; and this by inducing in the body a disposition contrary to that which it receives from these passions.

HOW WE THINK.

WHILE observing, the mind is employing its organs of sense, by varying their adjustments to search for definite outlines of objects and their relations to each other and ourselves. While thinking, our conceptions are the objects*—the mind's search is strictly analogous to that employed by

* The fact is that most well-educated persons, artists, men of letters or profession, and all persons in states of abnormal excitement, pass more of their lives with their conceptions than with the material realities.

"Nam cætera neque temporum sunt, neque ætatum omnium, neque locorum: at hæc studia adolescentiam alunt, senectutem oblectant, secundas res ornant, adversis perfugium ac solatium præbent; delectant domi, non impediunt foris; pernoctant nobiscum, peregrinantur, rusticantur."—CICERO.

A lover in Terence's Eunuchus is so unreasonable as to in-

means of our organs of sense in observing external objects. An architect, for example, after having examined individually and collectively all the materials required to build a house, and the relations it should have to the situation it is to stand on, and the condition of the family to inhabit it, forms a conception, and transmits it to paper as the plan for the instruction of his clerk of the works. Such a conception of objects, and formed in accordance with their fitness to each other, is a thought, the result of ordinary thinking.

The analogy between mental and physical force is, in thinking, obvious. Both

sist that his mistress, while with others, should think only of him—

"Cum Milite isto præsens, absens ut sies:
Dies noctesque ames: me desideres:
Me somnies: me exspectes: de me cogites:
Me speres: me te oblectes: mecum tota sis:
Meus fac sis postremo animus, quando ego sum tuus."

"Artists—their minds enlightened, and their fancy fraught
With finest forms by ancient genius wrought;
Whose magic beauty aw'd by spell divine,
The scythe of Ruin from the hand of Time;
And moved the mighty leveller to spare
Models of Greece so exquisitely fair."—Heyley.

effect their purpose by the instrumentality of their coils. The analogy is continued. When the coils are worn out or withdrawn, the physical forces remain, why not the mind force?

Coils of physical forces, as a watch, the coil of motion, may again be wound up, repaired, or replaced by another, why not the coil of the mind by its MAKER*, as well

* DEITY.

"Through worlds unnumbered though the GOD be known,
'Tis ours to seek him only in our own."—POPE.

St. Paul also indicates this as the way to gain a just conception of the Deity—"For the invisible things of Him from the creation of the world are clearly seen—being understood by the things that are made—even his eternal power and Godhead."

If this be so, is it not the duty of all who would impress young minds with an adequate conception of GOD, to lead them "through Nature up to Nature's God?" That this has the sanction of GOD himself may, I think, be safely inferred from this—that wherever illimitable power appears to have been at work—on the ocean—the earthquake—the desolation of the desert—in the gloom of the interminable forest—there

"Presentiorem conspicimus Deum
Per invias rupes, fera per juga,
Clivosque præreptos, sonantes
Inter aquas, memorumque noctem."

The infinite and the eternal are not positive ideas, but negative from the question which cannot fail to recur when-

as the coil of a watch, which measures time over space, by the watchmaker? The Intelligent Source of all power, all force, which gave consciousness of individuality here may renew it (as He does after sleep, and many changes in the mortal coil during sleep) after our apparently final sleep—death.

ever we would fix a limit, still there must be space beyond. Sir Isaac Newton's sublime conception of Deity was formed on the impossibility of conceiving a limit beyond which there might not be space and existence—"Æternus est et infinitus, omnipotens, et omnisciens, id est durat ab æterno in æternum, et adest ab infinito in infinitum; omnia reget et cognoscit, quæ fiunt, aut fieri possunt. Non est æternitas, et infinitus, sed æternus, et infinitus, non est duratio et spatium, sed durat, et adest durat semper, et adest ubique, et existendo semper et ubique durationem, et spatium constituit. Deum summum necessario existere in confesso est, et eadem necessitate semper est et ubique."

DEFINITIONS.

COIL.—The structure through which forces act, as, the organs of Sense for the mental force; the Barometer for gravity; the Thermometer for heat, &c.

RETRANSMISSION.——Every muscle has two nerves: one to receive impression, and the other to conduct its influence from the spinal cord to excite the muscle to contract. May it not be inferred that there are retransmissions from conceptions to the adjusting muscles of the organs of Sense, of Speech, and of Locomotion, especially during the sleep of those whose eye balls are seen to roll, whose whole frame is agitated, who give utterance to what is passing in the mind? May it not also be inferred that retransmissions pass from conceptions to the heart itself, from the accelerated circulation of the blood which accompanies mental emotions; and even that many local retransmissions occur to the minute arteries of some glands—the lachrymal, sublingual, and those of the skin, for example.

CORRELATION OF FORCES.—Any one may be the antecedent or sequent of any other.

RECAPITULATION OF CONTENTS.

* If the punishment for an outrage or a murder were to be inflicted in the same place, and with the same or like weapons with which the crime was committed, might not the hand of many a felon be stayed by the conceptions this law of our nature could hardly fail to excite.

HOW WE THINK.

* Professor Whewell on the Philosphy of Induction. vol. I., p. 41.

James Bennett, Printer, Journal Office.