On the
Relation of Speech to
Aphasia.

E. H. Lawrence Oliphant.

April 1886.
Aphasia is so striking a symptom of disease that its occurrence has been observed from earliest times. It has, however, escaped scientific investigation till comparatively recently. But though this is the case the literature is already voluminous. Some notes taken in the course of my reading have been put together in this paper, not with the intention of adding to the literature of the subject, nor in the expectation of being to throw light on the somewhat obscure symptom— but rather as an endeavour to lay side by side some of the views already advanced, and thus to be able to show what has already been discovered. What is most likely to strike one in commencing an inquiry of this sort is the number and contradictoryness of the theories advanced by successive writers; and in a study such as this, it is hard to distinguish fact from theory—a psychological description is apt to be taken for an explanation if couched in physiological language. Facts too are hard to get, for the accurate examination of a speechless person is, of necessity, difficult.

Before considering the question of aphasia I shall briefly refer to speech itself. And here we are met by an insurmountable obstacle in the impossibility of solving the question of the origin of language. This has afforded a field for many disputes amongst philosophers and philosophers. The “Bow-wow” and “Pooch-pooch” theories have had their supporters against those who held that the faculty of articulate speech was
The natural prerogative of man to distinguish him from the lower animals. Philologists seem to be more or less agreed in carrying language back to certain primitive word roots, as to the "germs" from which the species of animals have come. But beyond these word roots they are unable to go, and it is not necessary, for my purpose, to follow their speculations. He may be content to study the relations of language such as we now have it.

"Animals and infants," says Professor Max Müller, "who are without language are alike without reason: we must concede to animals sensation, perception, memory, will and judgment, but we cannot allow them any trace of what the Greeks called Logos, i.e. reason, literally gathering, a word which most rightly and naturally expresses in Greek both speech and reason." "Without speech no reason, without reason no speech."

He proceed to quote — against his own argument, as it seems to me — from St. Thomas Aquinas: "Nomina non sequuntur modum essendi, qui est in rebus sed modum essendi, secundum quod in cognitione reorita est." He uses the word characters as an argument and points out that the English word "character" has no meaning in French or German. "Caractère" has no meaning in French or German. It matter not whether the sound is articulate or not; articulate sound

"loc. cit. vol ii chap 2."
without meaning is even more unreal than inarticulate sound. If then, these articulate sounds, or what may be called the body of language, exist nowhere, have no independent reality, what follows? I think it follows that this so-called body of language could never have been taken up anywhere by itself, and added to our conceptions from without; from which it would follow again that our conceptions, which are now always clothed in the garment of language, could never have existed in a naked state. This would be perfectly correct reasoning, if applied to anything else; nor do I see that it can be objected to as bearing on thought and language. If we never find skins except as the garments of animals, we may safely conclude that skins cannot exist without animals. The argument quite fails to convince me. The conclusion he wishes to draw is not that skins cannot exist without animals, but that animals cannot exist without skins. If we say that some animals require to use coverings of their animal skins, for their own the preservation of their lives and for their prolongation, we would be brought to Herbart’s definition of man as a ‘clothing-bearing animal’. Max Müller finds fault with those who disagree “owing to the very influence of language which in most modern dialects has produced two words, one for language for sense, thus leading the speakers to suppose that there is a substantial difference between the two, and
not a mere formal difference." Yet the Professor himself tries to draw an argument from the singleness of the Greek word logos: such an argument is of no more value than that of Aristotle, which maintains that interest on money is unnatural, because τόκος means "offspring" and dead gold cannot have "offspring." This is surely arguing from barren words which more than any deed characterize than as subject to a cure.

In contrast to this, I quote a passage from H. D. Whitney's volume on the "Life, Beginnings and Growth of Language." First there is always and everywhere an antecedency of the conception to the expression. In common phrase we first have the idea and then get a name for it: this is so palpably true of all the more reflective processes that no one would think of denying it; to do so would be to maintain that the planet or God could not be found and recognized as something yet unnamed until a name had been selected and made ready for clapping on it: that the child could not be born till the christening bowl was ready. But it is equally true only not so palpable, in all less conscious acts, all the way down the scale to the most instinctive. The principle of life for instance was called animus, a blowing, a spiritus breathing, because the homunculus had a dim, to us wholly inscrutable apprehension of something within the body, frame, distinct from it, though governing it and directing it: and again
he says, "The doctrine that a conception is impossible without a word to express it is an indefensible paradox; it is impossible that it can except by misapprehensions and false argument. The immense gain in clearness of apprehension, in facility of handing over a conception by its naming, is not for a moment to be denied; only those are in error who so transform this advantage into an absolute necessity."

"Russmann quotes Dr. Bastian — or rather mentions him, as one of those who hold that intelligent thought is bound up with speech or word. But Dr. Bastian does not I think go so far as Mr. Külzer. He says, "That thought in all its higher modes cannot be carried on without the aid of language is a proposition which will be universally admitted at least if we use the latter term in its broadest sense. For as Lomone says, "Language in its general acceptance, might be described as a mode of expressing our thought by means of motions of the lips; it would thus include spoken word, only involuntary gestures that indicate the feeling, even painting or sculpture, together with those contrivances which replace speech in situations where it cannot be employed." Articulate speech in one or other of its modes, is, however, the process which for ordinary human beings is found to be inseparably related with the thinking process. Speech is, indeed, nothing else than a system of articulate words adopted by convention to represent outwardly the internal process of thinking." This last sentence does not seem to bear out the argument. As language — even in its widest

sense is adopted to represent outwardly the internal process of thinking, it is by no means follows that that internal process cannot be carried on apart from its outward manifestation. Nor is his conclusion more logically derived in a passage to which he evidently attaches importance, the only one from an earlier work, in his volume on "Brain as an Organ of Mind." After stating that it is by language that man has had his power of rising so high above the brute, and that by its particular races, have been enabled to advance through the multitudinous grades of civilization intervening between those who lived in the condition of savages, and those who now constitute the flower of European civilization:—after stating this, he goes on to say:—"If then the possession of Articulate Speech, with the superior accomplishments growing out of it, of transmitting thoughts by means of written and printed symbols, have had such an overwhelming influence in aiding certain races to elevate themselves out of a condition of the rudest barbarism, it seems even more certain still that Thought in all its higher modes could not be carried on at all without the aid of Language of some kind."

The case of Professor Lordat of Montpellier is described at length by Trousseau in his "Clinique on Aphasis" and bears on this question. Lordat became for some time aphasic after a fever, and has left us an account of his mental condition. He maintained that, though he had forgotten words, he was yet able to carry on elaborate trains of thought without them.

For example, he says that he thought of the Christian Doctrine, now and then, but could realize all the ideas of it, though he could not think of any of the words of it. He also rearranged his course of lectures during his illness. Rousseau, as also Kussmaul, throws doubts on Lordat's statements, on account of his known bias to the 'spiritualistic' school of thought, which maintained the independence of mind and body. Though Kussmaul distinctly states that he cannot altogether reject Lordat's remarks, yet he says that he finds it impossible to conceive a formula without symbols, a non-formula without symbolic words.

In regard to such a case as Lordat, it must be at the outset granted that he had originally acquired his ideas by means of language. But, apart from that, it seems possible to get over Kussmaul's difficulty by supposing that Lordat had ideas in his mind as well as verbal ones. And more word can not quite an idea fully, as such as that of the Trinity.

And may tell a truth
"Obliquely, as the thing shall breed this thought
Nor wrong the thought, missing the remote word
"So may you paint your picture, twice show truth
"Beyond mere imagery in the wall."

We can readily conceive of Lordat having in his memory some such picture as Albert Dürer's famous "Holy Trinity" (Melchisedech). And he might then try to express in word symbols - through a formula.
which he knew to exist—its very highest ideas, which might, after
all, in his healthiest moments, have been as fully conveyed to him by
such a picture as been by hearing the word sung.

Most of us in our daily tasks at school, have at some time or other,
—say, in trying to recite a piece of Greek dialogue—become painfully
aware that we could not remember a word of the formula, though
the idea conveyed by the formula may have been perfectly distinct,
(and yet not represented by the symbols of English words in the mind
of one who could think in the language he was trying to recite.)

Sir William Hamilton states his view of the relation of speech to thought
very clearly. He says that we could never have risen above the very
lowest degree in the scale of thought without the aid of signs. Language
is the attribution of signs to our conceptions of things. But as a
conception must have been already there, before it could receive
a sign; consequently, that knowledge which is denoted by the
formation and application of a word, must have preceded the
symbol which denotes it. Speech is thus not the mother,
but the godmother of knowledge. In general we must hold
that language must be viewed as posterior to the act of thinking
itself. He proceeds to compare language to fortresses planted
in a conquered territory (or to an arch built to hold up the tunnel
excavated in stone) to enable us to realize our dominion over
what we have already overcome in thought, to make every
intellectual conquest the basis of operations for others still

1. Lecture. Logic vol. i, p. 137.
beyond. I intended in first considering the question to support the view of the independence of thought and language—even of any sort of symbol—by a reference to the process of unconscious cerebration; for some of these are undoubtedly highly complicated and distinctly higher thought. In consideration, however, of some of the phenomena of automatic (or planchette) writing, it is doubtful if this illustration would be admissible.

I have already referred in speaking of Londe's case, to the realizing of ideas in symbols other than word-symbols. This subject is of some importance in regard to untrained deaf-mutes and to certain apheric patients, and also in regard to the mental operation of many healthy people. It is commonly taken for granted that we learn language by means of auditory word-symbols. [For one 'mother tongue' this is no doubt true; half-educated people require, by reading aloud, to convert graphic (or visual) word-symbols into spoken (or auditory) symbols, to enable them to understand what they read. Similarly, even a well-educated person may require to read aloud anything written in a local dialect, which he may have learnt orally in childhood.] But this is not always so. It is obviously not so in the case of deaf-mutes. Nor is it so with many people who acquire a knowledge of a foreign literature, without being able to speak it, or understand it when heard. Dr Bemard makes some interesting observations on this subject. "M. Chevrot a fait encore remarques et insisté

volontiers sur ce sujet, qu'il en est de la mémoire des signes comme de autres mémoires qui sont inégales, héritièrement parabatiques ou pas éducation, chez les divers individus. Tel sujet ferait souvent appel à la mémoire visuelle des signes, tel autre à l'auditive, un troisième à la motricité. En sorte que la prééminence d'un centre pourra devenir telle qu'il tienne pour sa dépendance non seulement celui qui dépend directement de lui, mais encore un ou plusieurs autres... Ainsi sont constitués, parmi les facteurs, des visuels, des auditifs, des moteurs.

Je veux le faire sentir que l'audition, comme, est un rôle, que which control the other. Sur le moment, a cause à which a gentleman recollects his contents by reading in mentale. The celebrated works, l'œuvre de Stéphane, marcel, a 'visuel'. Il est aussi le succès de la pièce produite par Mr. Scribe and Legouvé, and ascribes it the fact that one in writing imagines himself in the position of an auditor, the other in the position of a spectateur. "Rien de plus juste, dit Scribe. Saviez-vous où je suis quand j'écris une pièce? Au milieu de la pièce; les procédés de la parole intérieure ne sont pas autres que ceux de la parole extérieure. La connaissance de ces prééminences individuelles, de la mémoire des mots explique les erreurs et les contradictions que Mr. S. Eggé releva dans l'œuvre des philosophes qui ont étudié cette question avant lui. Mr. S. Eggé est évidemment un auditeur comme Socrate, Rivaud, Caradoss et de Bonald qui ont

1. La parole intérieure, pp. 40-41. quoter by Leved.
toute ses préférences. Aux mœurs tels que montaigne, maîtres de Biron, Taine, Lemoine, mais à Baudelaire, il répète toutes les critiques. Aux vues tels que Beroul (de Genève), il reproche d'avoir pris pour une vérité psychologique la maxime Platon "seipius imitant... L'idée d'une émotion intérieure exprimée par Chasme est simplement mentionnée par lui en note et déclarée un fait faux."

Bastien lays considerable stress on the comparatively greater vividness of our visual and auditory impressions than those kinaesthetic impressions derived from writing or speaking movements. For Bastien objects to the term muscular sense, and maintains that this so-called muscular sense or kinaesthesia is derived from apparent moving impulses coming from the parts themselves, and is not a mental or quiescent and outgoing current. How almost impossible is any such recall to consciousness, and how vague and blank a feeling is associated with the attempt, as compared with the recall of a visual or auditory impression, anyone may easily convince himself who will make the following simple experiment. Let him close his eyes, and with pen in hand make movements in the air as though he were writing the word "London." He may thus assure himself that he has a set of sensations accompanying these movements. After an interval, say, the next day, let him again close his eyes, and, without making any movement, attempt to recall 'in idea' these muscular and the sensations he previously experienced.
writing the above mentioned word. Let him then contrast his comparative powerlessness in this direction, with his ability to recall in exact terms the visual appearance of the word when written, or its corresponding sound. He goes on to show that the kinesthetic impressions from speech movements are still vague, as these are more automatic and less voluntary. But before we apply these principles to the study of aphasia it is necessary to remember that though absolutely true they will not hold, in the same degree, in deaf mutism. A slight modification of the manner of carrying out the experiment would also modify the result obtained. The experiment as carried out is scarcely a fair test, as people as a rule are not educated to receive impressions from these movements in writing. I shall later draw attention to several cases in which word-blind patients read through their muscular movements. If the experiment were rather to write the word in some recently acquired symbols, such as shorthand, he might find the comparative powerlessness not so marked. Some musicians, playing from memory, rely in part on their kinesthetic recollection as well as on their auditory and visual impressions. Or if that be considered the result of acquired automatic movements, it might be instance that some musicians, if asked to name a particular note when sounded, do so after sing ing in harmony to it. It is common for people learning a foreign language, such as German, to find it easier to write than to read, even their own manuscripts.

In feeling of deep regret, Mr. Arnold says: "Learning to

Speech is not of course learning language, for there is no necessary connection between words and sound and thought. Words must first be heard and known as the names of the things which are thought of and associated with them before they can become a part of language. Their chief use is to suggest to us by symbols their idea, and to keep them before the mental vision for the purpose of thought. This mental faculty of associating things and names is essential to reason, for without it any attempt would be vain, to go beyond passing impressions. ... 

Deaf mute have idea of things like ourselves, but no words to symbolize them. The deaf have memory also, but only of things. But it is evident that deaf mutes— even those who are untaught— have memory of more than things; a memory as doubt carries only mental images of some sort. "We may be tolerably certain," says John Hill, "that the things capable of satisfying hunger, form a perfectly distinct class in the minds of any of the higher animals; quite as much so as if they were able to use or understand the word food." 2

Kohn relates the case of a deaf mute boy, who was found wandering in the streets of Prague, and unable to give any account of himself. He was placed in a deafmute institution, and on learning to talk was able to state sufficient of his earlier circumstances to enable the police to identify his birthplace and secure for him his inheritance. He said that his father was a miller and he was able not only to describe the house and its furniture accurately, but also to give an account...
of his early life. The father had remarried after the death of the boy's mother and sister. Being unable to put up with the cruel treatment which he received at his stepfather's hands, he ran away. He could not name his birthplace - nor his father - but knew it lay East of Prague. Such a history brings Mr. Locke's 'Bizarre' fantasy within the range of possibility.

"I recall a nurse called Anne,
who carried me about the farm,
And one fine day a fine young man,
Came up and kissed the pretty
She did not make the least objection.
"Think, I, the!
when I can talk I'll tell mamma.
And that's my earliest recollection."

Some months ago, I saw a girl, in a deep mute class. She seemed the picture of low moral and mental development. On her admission to the school she had been utterly untutored and required instruction in the most elementary lessons in personal cleanliness. After a few days, she was receiving instruction in the necessary discipline of sitting still while some of the more advanced pupils were getting an object lesson from wall pictures. She, however, was looking on, and applied one of her recent lessons to the picture of a spouting whale, indicating by pantomime that it should use its handkerchief. This girl it must be remembered was unable to speak - in the ordinary sense - neither by articulation nor by finger alphabet. Yet this gestural speech
was of a tolerably high order - without word - if we apply to it Jackson's definition that "imperious in speech means precision of application to new relations of things."

I shall again refer incidentally, to the language of emotion and of the emotions. It is commonly stated by such writers as Dr. Hanau, that music is not meant to convey definite ideas to the mind of the hearer, but merely emotions. If however we are to agree with Herbert Spencer in considering the inflections and emphasis of our ordinary speech, as rudimentary music, we must admit that music may also be distinctly narrative. Without further explanation I shall proceed to quote a case from Dr. Benard's book on aphasia as an illustration. The case was observed in Prof. Charcot's wards at the Salpêtrière. An old man named Tibaut, affected with hemiplegia and aphasia could say only "non." Then displeased, "ah! ah!" when pleased, and voluntarily only the sign "cocoa" frequently repeated with varied inflections. "We cannot always succeed in guessing what the want, though her requests usually refer to some article of diet. His aunt then obtain the assistance of an amaurotic patient in the ward, who has the gift of understanding the meaning of the intention of haccaca. One day recently Tibaut wanted a bath. The list of her favourite foods and drink was exhausted and has been repeated several times. The amaurotic patient was called, and after listening stated that Tibaut wants a bath, which was the fact. We have frequently asked this patient how she

2. De l'Aphatie et de ses Diverses Formes, p. 245.
success in understanding her friends, but without getting any satisfactory reply.

"Human language, or speech, is only a superior kind of the faculty of expression which all or nearly all animals possess. Birds by their attitudes, and their song, dogs by their barking and howling, and by the contact of their moving antennae, and certain kind of fishes by sounds, probably related to their instincts of propagation, in short, the greater number of animals being, are able to communicate to each other species with species, and individual with individual, by vocal, auditory, tactile signs, their sorrows and their joys, their desires, their love, their anger.

For man and for other animals, language has the same origin, a complex origin, and one in which direct observation of little children at the period of lingual evolution may give us much valuable light. Mr. Ponty proceeds to support the statement I have just quoted, by describing the development of natural speech in childhood. He takes a child's natural gestures and ejaculations to be so many reflex acts, occurring at first spontaneously and unconsciously, later becoming consciously associated with the particular emotions and desires, or so finely being used purposely. He thus goes somewhat beyond Huxley's Jackson's statement that many of our signs of emotion or rather the voice tones of them may be looked upon rather as

actual parts of this, or that emotional state."

Most writers draw a distinction between this "natural language" and our peculiar articulate human speech. M. Perez goes on somewhat regardless of his opening statement, to show that the language which we do actually learn to speak is the direct result of instruction and of imitation. And he describes in detail the gradual evolution of articulate speech in children. De Bernard, however, follows M. A. Franck and M. Jules Simon, in rejecting this distinction between natural and artificial language, and as a natural corollary, he also rejects the definition of M. Proust and Grasset that "aphasia is the loss of the signs of artificial language with the conservation of those of natural language." De Bernard maintains that it is not possible to trace to their origin 'root roots'; even supposing that these could be identified, and he quotes the researches of those who have watched the development of speech in children, in support of his view. But the remarks of M. Perez can scarcely be said to bear this interpretation, though — in the English translation, his word are perhaps a little obscure from the use of the word 'imitative' in two senses. He says, thus, then we see imitative


and oral language developing side by side; the former, however, born
back for a time because of the rapid progress of the latter, which is
the necessary, universal, and so to say, official instrument of human
expression. And a few lines lower he says: "First of all, it is
necessary to decide which are the different parts played by instinct,
organization, heredity and education - i.e. imitation - in the acquisition
of language." In the first instance from the context, "imitation"
clearly refers to the language of gestures - for he has just given
a plausible explanation of the gesture of supplication, a gesture
 singled out by M. Simon as capable of no explanation by analogy.
In the second instance he states definitely that it is of the
"official instrument of human expression" he is talking.
In giving an account of the parts played by these different factors
in the acquirement of speech, he shows that a child does develop
a certain power of expressing itself without instruction but that this,
as quoted above, is in great measure overcome by the official
language. The factor 'heredity' is of interest; and in its importance,
even in the lower animals, authorities are much divided. M. Pring
quotes the story of the children leased by King Psamtikus for
sold ethnological research work, and almost suggests that such an
experiment might be actually carried out; not if came to see
in what language they would speak, but to see if they would
develop a language for themselves. He declares ourselves to be
absolutely incapable of deciding, à priori, whether children subjected for
a sufficient length of time to a like treatment would work out for themselves anything like a real language, what sort of language it would be, and what sort of ideas would be evolved in their brains, abandoned solely to the resource of heredity, transmission, and imitation of nature.

"There is no more improbability in the effects of continued use of the vocal and mental organs being inherited, than in the case of hand-writing, which depends partly on the structure of the hand, and partly on the disposition of the mind; and hand-writing is certainly inherited."

On progress with tout autant d'évidence que peuvent le faire pour les langues humaines, n'importe quelles recherches philologiques, que le fondement des ours du Kamtchatka est allié à celui des ours du Tibet... et des Andes. Cependant tous ces ours sont considérés comme des espèces distinctes n'ayant en aucune façon hérédité de la voix les uns des autres. Les différentes races humaines ne l'ont pas fait davantage. Tout ce qui précède est encore vrai du caquetage des gallinacés... du cancanage des canards aussi bien que du chant des grives, qui toute lancent leurs notes harmonieuses et gaies, chacune dans son dialecte, lequel n'est ni l'hérédité, ni le dérivé d'un autre, bien que toutes chantent en quarré."

2. Quatrefages, who quotes the above passage from Agassiz, points out that he has forgotten that no species of animal has ever exchanged its "voix" for that of an "espèce voisine."

par une jument et isolé au milieu des chevaux ne disparaît pas à Gracie pour apprendre à rennir. Au contraire, chacun sait bien que le Blanc le plus pur, placé dès son bas âge au milieu des Chinois ou des Australiens, ne parlera que leur langue et que la réciprocité est également vraie. In contrast to Agassiz's statement, that specimens always say 'in touch song', is that of Wallace. "It is found that young birds never have the song peculiar to their species, if they have not heard it, whereas the acquire very easily the song of almost any other bird with which they are associated." Darwin too held that birds have a natural and artificial language, as one may judge from the following passage.

"The sounds uttered by birds after in several respects the nearest analogy to language, for all\textsuperscript{1} the members of the same species utter the same instinctive cries, expressive of their emotions; and all the kinds that have the power of singing exert this power instinctively, but the actual song, and even the call notes, are learnt from their parents, or foster-parents. These sounds, as Darwin in the Origin, has proved, are no more innate than language in man. "... Mutual, which have learnt the song of a distinct species, as with the canary bird educated in the Tyrol, teach or transmit their new song to their offspring." But if it is possible to doubt that birds away from their parents reinvent their song, we must yet admit that birds have an instinctive knowledge of the cry of their natural enemies, just as the young of animals seem to recognize their

"A young turkey, which I had adopted when chaupiing within the uncracked shell, was, on the morning of the tenth day of its life, eating a comestible breakfast from my hand, when the young hawk, in a cupboard just beside us, gave a shrill chip, chip, chip. Like an arrow the poor turkey shot to the other side of the room, and stood there motionless with fear, until the hawk gave a second cry, when it darted out at the open door..."

"So old is the feud," says Spalding, "between the cat and the dog, that the kitten knows its enemy before it is able to see him, and when its fear can in no way come it. One day last month, after feeding my dog, I put my hand into a basket containing four blind kittens, three days old. The smell my hand had carried with it set them piping and spitting in a most comical manner." In my own case reading did not play its part; it might have been expected to do in the acquisition of language. Leaning English and French simultaneously, from my parents and from my nurse, I learnt French more rapidly, and for some time 'thought in' French, while telling English; thus using such expressions as 'shut the door, key' instead of 'lock the door.' In this discussion at length in individual cases, the cause of evolution both of the natural and artificial language. He quotes various authors to show that children do actually emit words to signify their wants, which they do also, as did the patient 'macaque,' by the inspection of their gabble.

This infantile babble is of astounding flexibility and variety of meaning, and every shade of emotion—astonishment, grief, inattention, sadness, etc.—is expressed in it, various tones.

For the details of the progress of children in acquiring 'artificial' language I merely refer to Mr. Perry's chapter on the subject, in which numerous references are made to other works on the same subject.

He refers particularly to the observations of Darwin, Mr. E. Taggs and Mr. A. de la Celle. I think I have said enough to show that while instinct and heredity and invention may have to do with a child's power of acquiring speech, yet instruction and imitation are the agencies by which, as a matter of fact, a child acquires what is popularly known as its mother tongue. Before passing from this subject to the acquisition of language by children, I quote Mr. Perry's opinion in regard to children learning words without understanding their meaning: I quote it more willingly as it so far corroborates an opinion I have long held with much difficulty—that there is a certain risk in teaching children to learn things by rote. Mr. Harland of Rugby has said: 'It is a great mistake to think that they should understand all they learn.' For God has ordered that in youth the memory should act vigorously, independent of the understanding, whereas a man cannot usually retention a thing unless he understand it.' What Mr. Perry says is to the effect that it is the dominant impressions which translate themselves, as general and individual ideas, into words and is usually retained. Often words are useless to the child; they do not interest him, and signify nothing to him. If he is forced to learn them

1. Dean Stanley, Life of Ruskin, 1879, p. 123.
2. loc. cit., p. 261.
like a parrot, he forget them more easily than those which represent some thing to his intelligence. These facts show that we should be much mistaken in considering rapidity in proper, in speaking - setting aside the question of the order - as a sign of precocious intelligence; the contrary indeed seems to me often true. He gives instance of the, and continues, "the more intelligent a child is, the less he ever wants, the more necessary is it to him that words should signify something to him to learn them, and this is why he only learns words in proportion as he gains ideas about objects. But children of little intelligence... words please idea, often take their place... When the children come to understand the sense of these words so long pronounced for their sound, they find that their minds are filled with new ideas, whereas intelligent children, slow in learning to speak, have got a large store of original ideas, which have come to them, not through the Channel of words, but by means of direct observation and experience." Another phenomenon to which I may be allowed to refer, is its counterpart in the aphasic state, in the rhythmic babbling of children, (which may be noticed in them long after the age of three - which is the period covered in Mr. Seres' volume.) He has explained this in regard to some words by the fact that certain idea, and sounds take possession of children. We may also notice in the more intelligent of them a mania for jabbering strings of meaningless syllables, jumbled together, altogether. He succeeded in examining a father, who had come to him fearing his child's brain was injured, by stating, that the feebleness of
his intellectual organ, overexcited at the time of his first attempts at speaking, came him to such rest and amusement in these mechanico-sabotages, which he has no trouble in producing, and which do not excite his brain, and which, moreover, charm and please his ear. Savage, in like manner, will go on for several hours at a time making a monstrous melopeia... and so also if the idle person in the South of Europe... will repeat a refrain a hundred times in the same afternoon. These remarks are suggestive of Pfeffer-Gaudens' metaphor of barrel organisms, and of the mind becoming intoxicated with a letter. There is certainly something sedative in more rhythmic monotony. I think a large part of the sedative effect of tobacco is due to the rhythmic movement of smoking. The dreamy condition thus induced by this monotony, has been amusingly described by Dr. Stevenson, with his usual felicity, where he tells of his paddling down a French river, counting his 'strokes, and forgetting the hundred the happiest animal in France.'

In treating of the aphasis state, in one of those papers, which have largely influenced subsequent writers on this subject, Mr. Hurling Jackson admitted the impossibility of any proper classification of aphasis based at once on its clinical or psychological aspects. Dr. Bastian seems to find a similar difficulty; for in his article on Aphasis, in his Dictionary of Medicine, he arranges his varieties of cases in clinical groups; while in his volume on "Brain e, an organ of mind" he rather gives etiological division — though these clinical nips, in part at any rate, coincide if, to use a geometrical figure of speech, the one were 'superimposed' on the other. Professor Jacard rather attempts to combine these two methods. Before going further, however, I shall give in a tabular form some of the various forms of classification which have been proposed.

Professor Jacard gives the following clinical table:

\[
\begin{align*}
\text{Aphasis} & \begin{cases} 
1. \text{Abolition de l'idéation verbale} & \text{Hésitation.} \\
2. \text{Abolition de la transmission verbale} & \text{Lexicaphie.} \\
3. \text{Abolition de l'expression verbale} & \text{Glossoptie.}
\end{cases}
\end{align*}
\]

He explains his tables as follows. 1. Pour parler il faut: 
2o la traduction, le retournement de cette pensée par les formes verbales, c'est 
la caque j'ai appelé l'idéation verbale; 
3o la transmision des incitations verbales à l'appareil moteur qui en 
accompîte la projection au dehors; 
4o la coordination harmonique des mouvements complexes nécessaires 
pour cette projection. 
5o l'exécution de ces mouvements par les agens périphériques. Ce 
cinq actes successifs peuvent être rames à trois opérations fondamentales, 
l'une de formation, la seconde de transmision, la troisième de transmision. 
à expérim. De failure accordingly of any one of these five processes 
give rise to aphemia and ril fall naturally under one or other heading of 
his tables. 
S. Bétham's clinical groups are as follows:
Cases with defects of an apheric type only;
1. Loss of power, both of speaking and of writing. (Typical Aphemia)
2. Loss of power of speaking, but power of writing retained. (Aphemia)
3. Loss of power of writing, but power of speaking preserved. (Aphemia)
Cases where apheric or amnestic defects are combined in the same individual
4. Loss of power of speaking with an amnestic defect in writing
5. Loss of power of writing with an amnestic defect in speaking.
Cases where more amnestic defects alone may exist in speech, in 
writing, or in both modes of expression.
S. Bétham also tabulates his cases to show their mutual relations. Both 
as mental or Neurological processes as follows: 

1. loc. cit. p. 227. 2. Quain, Brit. of Medicine, aortic Aphemia. 3. Brain in an Open of kind p. 615.
1. Defects of verbal memory, that is defects in the Association of Ideal Things or of conceptions with ideal words.

   A. Amnesia Agapal (sic)
   (a Paralytic variety: b. Incoordinated variety)

1. Diminished Excitability of the Auditory Word-centre.


3. Damage to Visual Word-centre and to Tensor-fibres of Auditory Centre; together with certain defects producing Incoordinated Amnesia.


II. Defects in the Association of Ideal Words with Neural movements for Speech and Writing, or for better of them simply.

   B. Aphasia

5. Damage to first parts of outgoing tracks leading from Cerebral Word-centre to left Corpus Striatum.

   C. Agraphia.

6. Damage to first parts of outgoing tracks leading from the left Visual Word-Centre

   D. Agraphia

7. Damage (a) to first parts of outgoing track leading from left Auditory Word-centre.
   or (b) to some lower parts of the same track
   or (c) to the actual Motor-centres for Articulation.

Group A would fall under the head of what Dr Ross terms Hearing Aphasia and the rest under what the same author terms Motor Aphasia. These may be put together and form cases of General Motor Aphasia.

* Medical Chronicle Jan. 1888.
As an autonomous process, says, "Kuomant, speech consists in articulation and diction. . . . All lesions of articulation may be styled dysarthria.

Dysarthria disturbances, due to poor mechanical defective in the external apparatus of speech and their motor nerves, he terms dysarthria. . . . Disturbances in the formation of thoughts are excluded by Kuomant from consideration as there would open up the whole question of mental disturbance; these, however, he terms leuegias or ungarrity.

Dr. Bannister's groups fall under somewhat the same head as do Dr. Bastian's. He treats in successive chapters of

1. La cécité verbale
2. La surdité verbale.
3. L'aphémie
4. L'aphasie
5. Aphasia complexe. (Troubles divers du langage.)

In his treatise on Neurotic diseases, D'Hammond makes little or no mention of any kind of aphasia. He groups his cases, according as they fall under one of two heads of

1. Ataxic Aphasia.
2. Anemic Aphasia.

Dr. Bannister in large measure follows Dr. Bastian in his divisions.

His cases are either amnestic (or amnestic) or aphasic (or aphasic).

In each case, according to Brocas, the functional derangement may be either 1. paralytic or 2. incoordinate.

Thus in Paralytic amnesia words are forgotten but can be repeated when heard; while in Incoordinate amnesia there are plenty of words but there are roughly and unconsciously used.

In Paralytic aphasia the form of utterance is lost. Patient cannot repeat.

In Incoordinate aphasia the patient may use words which are wrong, but which have some connection in sound or sense, and he may be conscious of his mistake.

He distinguishes ataxic and incoordinate cases, from the one set arising from destruction of grey matter or white fibers, while the later arises from instability of cortical cells.

Cases of aphasia in men are usually more or less complicated and no two cases of aphasia can be called identical, varying as they must both on account of the lesion, and so on, of the lesion and on account of the differences in regard to the original mental powers of different individuals. It is perhaps questionable whether any scheme of classification will prove adequate for clinical purposes. In his chapter on Aphasia in his recent work on Nervous Diseases, Dr. Erasmus Jones, Stewart does not formally classify his descriptions, but rather by means of illustrative cases shows what phenomena may be expected according to lesion in the or that portion of the effort, central and effort, apparatus employed in the production of language. Dr. Broughton, so far, avoids many of the difficulties by his group of 'Aphasia complete.'

I shall in the first instance describe some of the prominent features in these disturbances of speech arising from lesions on the affected and perceptive side—these cases which are in Dr. Penrose's group of 'Sensory Aphasia.' I do not attempt to enter upon the history of aphasia nor of any of its forms. This part of the subject is discussed at great length by such authors as Kussmaul, Hammon, and Broughton. The latter, in particular gives full details, both in regard to aphasia generally and to the several divisions. He refuses to admit the claims of priority laid on behalf of the Doctor (more or less, father of the idea, of Montpellier) and gives all the credit possible to Dr. Boree, of whose unedited manuscripts he has had the privilege of using.
Cases of disorders of Speech, due to lesion auditory perception apparatus alone, are rare—excluding of course cases of deafness.

In cases of pure 'word deafness' the patient hears but is unable to understand what is addressed to him. Such cases are undoubtedly rare, though possibly some are overlooked, and the phenomena accorded with simple deafness or to insanity—or as in Trouseau's patient Paquereau, to defective intelligence. This patient was unable to imitate the movements of playing a clarinet when told to do so. He accomplished these movements however, when they were given through before him. Trouseau as already mentioned thought this was due to the loss of intellectual powers which he maintained usually accompanied the aphasic state. "Touessel quotes the case as one of amnesic amnesia."

Besnard quotes it as one of word deafness, which seems the more probable view. Another feature of the case was that the patient was unable to turn over the page at the proper time when Trouseau was reading aloud. Besnard quotes several cases, the most complete is one recorded by "Giraudet" and is of special value as the post mortem appearances are given as well as the clinical features. This patient named Boquiner, was evidently not deaf as she could hear the ticking of a watch at a normal distance. She was however quite unable to understand any words addressed to her as a rule, though occasionally she seemed able after a considerable time, to make out what had been said. She was however able to understand writing to which she replies either by writing or verbally. She spoke little and with some hesitation.

1. loc. cit. p. 269.  
2. loc. cit. p. 264.  
3. loc. cit. p. 479.  
but there seems to be no mention of her having ever heard much.

And the case of recorded by Dr. Bécan is of equal interest. Louis Jeanne, aged 29, was a patient in M. Charcot's wards. She was admitted to the hospital suffering from obliteration of the abdominal aorta. Six years previously she had become aphasic and aphasic. For two months she could say only 'yes' or 'no.' Her speech gradually returned. On admission to hospital her speech was as correct or intelligible as in a person who had never lost it. She has always been able to read. She was then able to answer spoken questions which she understood perfectly. She was however, for a short time, at the period of her first attack unable to understand what was spoken to her—"les paroles n'étaient que des sons qui n'ont indistinct, partiel à celui des conversations dans une foule." Her neighbors considered her deaf but she heard all ordinary noises quite distinctly. She was taken to hear a military band, but did not hear any musical sound, though she knew when the band was playing. She died shortly after admission to hospital. The point to which I would draw attention is the fact that these two cases are that there is no mention of mistakes in word being made in speaking - or paraphasia as Kussmaul calls it. There is no mention of a phenomenon in the second case, but the history is taken from the patient's own account. Dr. Bécan lays emphasis on the confused noises heard by the patient when addressed. The object of Kussmaul's companion of the patient hearing as it were a foreign tongue, for that sound articulate, though not understood.

Dr. Bécan quotes two cases from M. Boudin and Valentin in which there was paraphasia. He also refers to a patient of M. Charcot named Hug.

who could hear the clock striking but could not count the strokes. A case of note-deafness, quoted from "mind," as illustration of Jeanmitli's inability to hear music, was not dwelt on, as it has no direct bearing on disturbances of speech. Of more interest are some cases in which comprehension of one language was lost and of another preserved. For example, one patient understood his native but not French; another had forgotten German but remembered French Russian.

In a series of articles, published since this paper was commenced, Dr. Ross records a case of pure word deafness. The patient presents the symptoms of the two cases already described but in addition there was still marked paraphasia. He could not bring "public house" or "asylum." He did not obey verbal commands but obeyed written ones. He did not, for instance, know whether to or not he were 100 years old when asked. He recognised at once when his question was written. Curiously enough, he sometimes understood somewhat complicated communication. His intelligence did not seem much impaired. His son-in-law volunteered the statement that the patient's judgment was very good. Dr. Ross considers that word deafness is probably always associated with the wrong naming of objects, or with inability to name objects; though the converse of this is not so; for patients may preserve both these symptoms yet not become deaf.

Careful post mortem examinations were made in the two cases already quoted from Dr. Bearn. "L'hémisphère gauche" in the case of Jeanmitli "s'est inspiré d'un ramollissement étendu qui a détruit le cap et le pied de..."
la troisième fontale, tout l’insula, toute la première temporospinal et une partie peu étendue du lobe pariétal inférieur. Au niveau de l’insula et de la troisième fontale, la substance grise inférieure est réduite à l’état de membrane jaunâtre, sa moyenne plus de 5 cent. d’épaisseur.

En examinant la pièce par la paroi ventriculaire, on constate la destruction de toute la tête du noyau caudé et du tiers antérieur de la couche optique. Le corps de Heebhrig montre la destruction de l’avant-mur et du noyau ventriculaire moins la partie postérieure touchant au campène sensitif qui est intacte, comme la partie antérieure de la couche optique et la queue du corps strié. Tout le reste de la capsule interna et des parties antérieures des ganglions est réduit à l’état de membrane jaunâtre, comme nous l’indiquons plus haut.

In Piccard’s case the lesion is more limited. A tumor of the size of a nut was found occupying the posterior part of the first and second temporo-sphenoidal convolutions, bestowing (à cheval sur) the parallel fissure. Dr. Bernard quotes five cases where a lesion, similar to this last one, was found.

The other chief variety of Sensory Aphasia is word-blindness, and it has many features analogous to those of word-deafness.

Numerous cases are now on record, but it is evident that our knowledge of the subject is far from complete. Trouillard on this, as in regard to most of the questions on this subject, lays down the law definitively. The statements of authors are however somewhat confusing.
Manuel warns us not to confuse word-blindness with inability to read from deficiency in the field of vision; especially from right hemianopia, which by preventing the patient from seeing the end of the road hinders his reading. He explains by this confusion of cases the paradoxical phenomena observed in hemianopia: "the patient e.g. can read off, while passing, the names upon the taxic signs on the street, but are nevertheless incapable of reading letters or words with a steady gaze." Besides on the other hand maintains that in every case of word-blindness—properly examined—there has been found hemianopia, or as any rate restriction in the field of vision. It is difficult to understand how mere restriction in the field of vision should by itself prevent one from reading altogether. There are many cases, described as word-blindness, in which the patient could read by spelling out the letter at the word as a child might. Such cases may be due to restriction of the field of vision. In reading at distance, the field of vision, clear enough to read word, is small even in health, and does not take in much more than a word of 5 or 10 letters, with medium type. If an attempt be made to read, looking through a diaphragm with a small central opening, it will be found that fluent reading is hindered so soon as the field is restricted to syllables. And when the field is little further reduced to single letters its word must be spelled out slowly; but can by this means be read. There is, then, obviously, something beyond this restriction in the field which causes the word-blindness. Any experiment with an artificial hemianopia would be difficult to carry out but

but I am told by an ophthalmologist that a right bilateral homonymous hemiopia, such as might be produced by lesion of the optic tract, does not cause word blindness. In the face of records of word blindness without the impairment of vision it is difficult to accept Bernard's statement without much fuller evidence. At the same time, it must be admitted that hemiopia or restriction of the field of vision is easily overlooked in the examination of a patient, and is sometimes difficult to determine.

In a speechless child's case I spent some time trying to discover whether the field of vision were complete or not. I had come to the conclusion that it was considerably restricted on the right side, when I found he could, in that region, see fresneri quite clearly! In one of Dr. Bernard's case, there is no mention of hemiopia from beginning to end (Case 11) though the oculist's report is given (Dr. Albans).

In other cases recorded by Dr. Ross, in his recent papers, there was complete right bilateral homonymous hemiopia. The subject of hemiopia evidently requires further investigation—especially in its relation to word blindness. Professor 

Professor Jaccard, in his treatise on the practice of ophthalmology, mentions in a footnote the occasional occurrence of hemiopia in cases of aphasia. Two such recent works as those of Princess de la Tour and of James refer to hemiopia and to word blindness, but in no way connect the two symptoms.

The chief symptom of this condition is as the name implies, an inability on the part of the patient to distinguish written or printed words or phrases.

3. An Introduction to the Study of the New System. 1854.
Symbols. As before mentioned, the patient may sometimes be able to spell out a word letter by letter just as in some cases, a word deaf patient may be able to understand a word if it be uttered syllable by syllable.

In some cases the patient is still able to read figures (Arabic numerals), possibly because there are fewer in number than the letters of the alphabet, and therefore better organized. Keeping the ability to read figures may be alone lost. Some patients can decipher words, but not 'less' or higher powers. In one case the power of reading musical notation was alone lost at the beginning of the disease. This patient subsequently became completely aphasic and died paralysed.

As is natural, the power of writing is much interfered with as the patient cannot read what he writes. If he lifts his pen he at once 'loses the place' - in the sense of not knowing what is the last word he has written. Some of the features of the condition are due simply to the hemispheres. For instance the patient may write only on one half of the page. One patient who used his left hand found it easier to write his lines vertically from above downward, his writing did not differ from ordinary handwriting. Some patients are able to copy letter by letter, or even copy printed character by 'current character'. In a case of pure word blindness a patient wrote very much as does a person with his eyes shut. I feel some patients, shutting the eye, does not affect their handwriting.

It has been noticed by Mr. de Capraville that curiously enough some patients could read manuscript but not print. This is, in some case,
at any rate, due to a curious stratum by which the patient got over their difficulty to a certain extent. Bernard gives a very remarkable example, observed in his Albert's practice. I made allusion to this case in speaking of kinescopic impressions earlier in this paper.

This patient, Mr. P., had some time previously become hemiplegic with disturbance of speech of a paraphasic type. From then, he so far recovered, one day, on wishing to transact some business, he wrote a letter, and was on the point of posting it, but wishing to make a correction he found to his astonishment that he could not read a word of it. Some time later, he attempted to play billiards, but found that he could not see the right half of the table—not even the right half of the ball he was trying to strike with his cue. On examination, he could not read his own name or his address, a long phrase or even a single letter, sans faute notable, d'orthographe sans panne de note. "Sens" dit-il, "comme si j'avais les yeux fermés, je ne lis pas ce que j'écris. De fait, il est aussi bien les yeux fermés. Il vient d'écrire son nom, on lui dit de le lire. "Je sais bien" dit-il, "que c'est mon nom que j'ai écrit, mais je ne peux plus le lire." Il vient d'écrire le nom de l'hôpital, je lui ai dit : mon tour sur une autre feuille de papier et je lui donne à lire. Il ne peut pas d'abord, il s'efforce de le faire, et pendant qu'il se livre à ce travail, nous remarquons qu'avec le bout de de sa main droite il retire une à une les lettres qui constituent le mot et arrive avec beaucoup de peine à dire "La
Salpetrière. On entend 'me d'Aboyss, l'adresse de son ami, et trace avec le doigt dans l'espace la lettre qui compose le mot et après quelque instant il dit: 'C'est la me d'Aboyss, l'adresse de mon ami.'

This patient could read print very slowly and see as well, much more slowly than manuscript. If a pen was placed in his hand and he was made to make movements, to write a word he could read his movements as before. A similar case is quoted by T essential from Westphall. The more severe of this condition may also exist. Dr. Grant records a case in which the patient had lost the power of reading manuscript but could still read print. Dr. Bernard quotes a case recorded so far back as 1876 in which the patient could not read even his own writing and there was distinct paraphasia or paucity - substitutor slim, vocabulum nonum pratacto.

Some patients seem usually able to decipher pictorial note. In a case of pure word blindness recorded by Dr. Ross, the patient seemed to think he could read but what he seemed to read had no connection whatever with the text. For instance when shown a paragraph in the newspaper 'The Bishop of Hereford is highly indisposed' he read, 'The money market has been brought to a close.' He could name objects quite correctly. In fact speech does not seem to be much affected in case of pure word blindness, but the condition is usually complicated by some deafness, or by motor aphasia, in the earlier stage at least. The pathological division probably lie, 5, sur l'hémisphère gauche dans le pariétot postérieur du cerveau pariétal inferior. "Broad bent has described a case in which the

1. loc. cit. p. 776.
was a case of the region corresponding in situation with the posterior end of the fissure of Sylvius externally, and the junction of the descending cornu with the body of the ventricle internally. In fact it occupied the thickness of the transverse lamina separating the extremity of the fissure of Sylvius from the ventricle.

I shall not, in this place, refer further to the condition of deaf mutism or of totally blind persons.

A condition of paraphasia is found in those further lesions in Dr. Bastian's 1\textsuperscript{st} and 2\textsuperscript{nd} groups. Mistakes in word are made and word substitutions, and there may be curious inversion of words, as when the patient says 'pipe' for flute. It is unnecessary here to describe cases of absence of speech occurring in cases of insanity, cases of what Racovitza calls 'aphasia par delirium,' such as we find in dementia, or cases in which the patient keeps an obstinate silence from the influence of some insane delusion. Such cases are common in human practice. No need hypothetic aphasias condition to be distinguished from hypothetical aphasias -- is -; such cases usually improve under judicious treatment: Galvanism, locally applied, sometimes act like a charm. But even in such cases a guarded prognosis must be given, for what appear to be a purely functional disorder may be found to be followed later by pure organic mischief. Malingerers is sometimes difficult to detect. A medical friend tells me that he recently 'cured' a case of complete aphasia in a young girl by the production of the family 'cause.'
In treating of motor aphasia as we have seen, Dr. Hammond
makes a division of his cases according as the aphasia is Amnesic or Ataxic
Aphasia. And he lays stress on the distinction as being clinically, psychologically,
and pathologically, a rational one. "In all the cases of which hemiplegia formed
a feature, the aphasia was of the ataxic form, while then there was no
hemiplegia the aphasia was amnesic. In the one the individual was
deprived of speech, because he could not coordinate the muscles, and in
articulation, in the other, because he had lost the memory of words."

Dr. Hughlings Jackson similarly remarks that the making of frequent
mistakes in word is nearly always associated with local cerebral
softening and is accompanied by hemiplegia; while slurred articulation
is produced by cerebral hemorrhage and is associated with hemiplegia.

Dr. Bernard thinks this division is arbitrary, and unsatisfactory.

Kussmaul too uses this distinction under protest. "Before we begin
this task," he says, "however, with a description of ataxic and amnesic
aphasia, we must again premise the remark, that we regard both
of these designations, against which we have already raised
objections, and which we retain only for objective reasons, as not
heeding inferences. Ataxic aphasia is in a certain sense also amnesic,
and amnesic aphasia ataxic." Professor Gratiolet Stewart, too, seems
to consider this distinction unsatisfactory.

1. loc. cit. p. 217.  
3. loc. cit. p. 11.  
4. loc. cit. p. 750.  
Dr. Humphry Jackson's description of the aphasic patient's state has done so much toward forming the currently received opinions on the condition that I shall not now give a brief summary of it, as given in his articles in Volumes 7 and 9 of 'Brain.' Dr. Jackson adheres to the customary distinction drawn between intellectual and emotional language. So the higher forces to apply the term proportionally. Words may be used proportionally or not; that is with a particular meaning suitable to the existing circumstances, and a meaning to be conveyed by the words themselves apart from the tone of voice or accompanying gesture. For example, the word 'yes' may be used proportionally as a direct affirmation; in ordinary speech it is frequently used otherwise - as an interrogative particle or simple exclamation. He gives an amusing example to illustrate the meaning of a word being used proportionally, which was understood as one cannot proportionally and non-proportionally. A gentleman at a foreign table while called out 'Eau!' the waiter understood him but his friend thought he was in pain. I might quote a somewhat similar instance. A Scottish gentleman was on his way to the South of France, and on leaving from the steamer at Goteaux tried to get lunch at an hotel, but every time he called 'waiter' the attendant brought him water (water). There is no 'faculty of speech or power of speech apart from words revived or revivable in proportion any more than there is a faculty of coordination of movement apart from movement, represented in particular way.' He makes a similar remark in regard to memory. There is no faculty of memory apart from things being remembered. The printed or written words and letters are images, but they differ from the image of objects in being artificial and arbitrary.
in being acquired later; they are acquired after speech and have their meaning only through speech; written word and symbol of images. It would be entirely beyond the scope of this paper to enter at length on the question of memory. But the following quotations may be made from Ribot as they bear on Jackson's argument.

"Memory is, as a biological fact—by accident a psychological fact: he describes it further as "a peculiar modification impressed upon the nervous element in an association, a specific connection established between a given number of elements." We use the word memory in a general sense in perfectly justifiable. It designates a faculty common to all sentient and thinking beings— the possibility of conserving and reproducing impressions. But the history of psychology shows that it too often forgotten that this general term, like all others of its class, is of value only when applied to particular cases, and that memory may be resolved into memories, just as the life of an organism may be resolved into the lives of the organs, the tissues, the anatomical element which compose it. These quotations from Ribot's volume on Diseases of memory are sufficient to show the line of argument which he adopts in his essay.

Dr. Jackson makes several statements in regard to the aphasis patient state, both as regard his positive and his negative condition. Taking the latter first we find that:

1. The aphasis or speechless patient does not speak. To this general statement there are however various exceptions, to which we shall refer
in talking of the aphasia "recurring" or "occasional utterance."

2. The speechless patient does not write. He seems to state his opinion in regard to this quite clearly for says: "The following dicta may be of use to beginners. Using the popular term "talk," one may say that if a patient does not talk because his brain is diseased, he cannot write (express himself in writing) and can swallow; if he cannot talk because his tongue, lips, or palate are immovable, he can write and cannot swallow well. But this is meant the something more than a dictum for beginners, for he says a few pages farther on, "I submit that the facts that the patients do not talk and do write and do swallow are enough to show that there is no disease at all, in any sense except that the patients are hysterical (which is no explanation) or that they are pretending. There can be no local disease at any rate." He also says that if such a case were to occur he would say that the patient has internal speech. That is of course obvious, but that such cases do occur seems to be denied by Dr. Jackson. He must admit with him that few of the cases, where there is a record of speech being retained and writing retained, bear investigation. But still such cases, though rare do undoubtedly exist. The case, commonly quoted in support of this, from Trouseau may fairly be challenged as being probably a case of simple hysterical. Dr. Jackson quotes it as one of pure motor aphasia. The case is that of a young man, a comin of the Paris Hospital. He consulted Dr. Trouseau and made signs that he
he could not speak, and handed me a note, in which the history of his illness was detailed. He had written the note himself and sealed it with. A few days previously he had suddenly lost his senses, and had been unconscious for nearly an hour. When he came round, he exhibited no symptom of paralysis, but could not articulate a single word. He moved his tongue perfectly; he swallowed with ease, but, however much he tried, he could not utter a word. ... He completely recovered his speech five or six weeks after the invasion of the complaint [Facardisation was imperfectly applied for a fortnight.] It is very remarkable that during the whole course of this very singular affection, he could manage all his affairs, continue them even in a certain measure, by substituting writing for speech. Apart from the resistance of the case to facardisation, it looks like a case of hysteria. Professor Grainge Stuart says: 'I have heard of a gentleman who suffered from aphasia with loss of speech, but retained the power of writing, and so was able to retain an official position, and discharge with ability and success its somewhat complicated duties.'

Dr. Ross says: 'A man may be totally unable to express his thoughts by articulate words, yet be able to write with tolerable freedom to express his wants by pantomime.' He then goes on to narrate a case seen by him along with Mr. Subelife. The patient was quite unable to articulate a single word, but he could write with great readiness, promptness, and ease, and give instructions about business matters, and although his writing was not very good, Mr. Subelife could decipher it without much difficulty.

Dr. Hammar describes a similar case. "The patient suddenly lost the power of speech - he had previously been entirely hemiplegic - but his mind remained perfectly clear, and though he could not utter a word he understood all everything that was said to him. The arm and leg on the right side were profoundly paralyzed. In this case there was no loss of the memory for words, and no difficulty in writing." It is somewhat difficult to reconcile this last statement with the fact that there was profound paralysis of the right side. Dr. Barnard records a case of M. Cesati in which the patient "could only say 'hah! hah!'." He was able to write in a small, jerky handwriting, and the restoration of his hand was far easier. Dr. Barnard quotes several cases.

One is that of a young scholar of Trinity Coll. Dublin, who had an apoplectic fit one day after batting in a lake. He became conscious in about a fortnight but remained speechless. He spoke but what he said was quite unintelligible - so that he was thought to be speaking in a foreign tongue. He perfectly comprehended every word said to him. He perfectly comprehended printed language. He expressed his ideas in writing with considerable fluency; and when he failed it appeared to arise from caution rather than from inability, his words being orthographically correct, but sometimes not in their proper place.

His general mental powers seemed unimpaired. He wrote correctly, answered historical questions - he translated Latin sentences correctly. His power of repeating words after another...

person was almost confined to certain monosyllables.

1. A steward of a steam packet, at 36, after complaining of severe headache had several epileptic fits. He became drowsy and lost the faculty of speech entirely. He was also completely paralyzed. He gradually improved in some respects but on admission to hospital eight months later he could not speak at all; he could not articulate a single sound. He could perform all the possible voluntary movement with his tongue, cheeks, lips etc. He was perfectly intelligent and comprehended what he read as well as what was addressed to him. He was able to keep up a conversation, writing on slate and his interlocutor speaking. He wrote with remarkable facility a very excellent and legible hand, expressing himself with point and accuracy, except for an occasional error of spelling due evidently to defective education. He was eventually taught to speak again.

2. Bonilla records the case of a man who, in answer to questions, replied by words which had no connection with the question. But he gave correct answers in writing. He could write to dictation but misread what he had written. He named things quite wrongly. Dr. Finlay tells me that he has seen several such cases, where he was able to exclude the possibility of hypnosis or malingering. One of these is described in the Glasgow medical journal. Three years previously she was seized with slight right side paralysis, 10 days after her second confinement. Her speech was entirely lost. After some time she regained the use of the word 'yes' and 'no' and of a
few isolated words. After the first confinement she lost the use of
even these few words. She occasionally utters a sharp, sharp little
cry, but no other sound. She evidently understands what is said
to her. She knows the right word and answers eagerly to them when
we suggest them; she can turn up passage in the Bible, not only
by the name of the chapter or verse, but she can find the passage
wanted by giving her the opening word of some well known Psalm
or chapter. Further she can read short paragraphs from the
newspaper and can stand an examination on them. She
has had a fair education and could write down readily an
answer to our questions when we chose to ask her to do so,
instead of suggesting replies and getting affirmative or negative
motion of the head. All this shows that though unable to speak,
hers knowledge of words, both spoken and written was almost perfect,
and her memory of word was evidently not lost for she could write
down short replies with the word she wanted. . . . She suffered
from difficulties in the use of written language. She wrote down with
the utmost care answers that could be expressed in single word,
or even in two or three words, but when I asked her to write
and write a letter she shook her head in despair. Dr Finlayson is
quite convinced that there was no deception in this case, nor any
hypothetical affection. Dr Hui of Smith of Govan in whose practice the case
was considered in Dr Finlayson's opinion of it. The retention of the
power of writing even in a limited degree is of interest in this case,
for the loss of speech was unusually complete— even to the use of 'yes'
and 'no'. 
There is another case recorded by Bonilla, in addition to the one I have already quoted. It is of importance as an abscess was found in the brain after death, proving conclusively that there was local disease. The patient died in the surgical ward of Phil. Boyer. He had received an injury, which had forced the left eye out of the orbit and caused aphasia. During the eight days that he survived, the power of speech was entirely lost, although he could still move his tongue. He understood what was said to him but was unable to answer. On the other hand, he wrote down his wishes on paper, and stated in writing that he remembered but could not utter the words. In a case recorded by Bonnier an abscess, of traumatic origin, was found in Broca's convolution. After the healing of a wound made by the trepan, the patient had regained consciousness, intellige, movements, but not the power of speech. He made himself understood by gestures, played with his companion, copied from dictation and wrote out his own thoughts. We may laugh with St. Bernard, when he makes fun in his fleuveante fable way of the writers who quote all the ancient classics to prove the existence of aphasia in early days. Homer and Saithe, Herodotus & St. John the Evangelist are by them looked upon as authorities. les savants Médecins ont rappelles à l'Envi et rappellent encore souvent, en traitant ce sujet “ce père bilingue, ce vrai et le danger qui découvre dans Oriol les sept Sacrements de l'Evangile.” At the same time an accurate record of cases is of interest no matter when they were observed. The history of the congenital aphasia of the son of Crown and its sudden disappearance under the influence...

of emotion, is as valuable - if authentic, as is a similar case recorded by Dr. Bastian. Dr. Bern's himself gives the story, and also quotes an inscription to show the existence in early Greek time of minor writing. He even, for his own purpose quotes lay writers, such as Rigoda, who in one of his novels gives a realistic account of an aphasic patient. Such descriptions from unbiased laymen are undoubtedly of value, if given by competent observers. Against Rigoda I might venture to refer to our English novel of "The Golden Butterfly." But a description of the aphasic state from the patient himself is of special value. The cases of Rosten and Lordat are quoted by most of the authorities, but that of the equally illustrious Johnson seems to have escaped the attention it deserves. His case has the additional merit of being written shortly after, if not during, his attack. So that, although it is no doubt familiar, I give his account in this place; for it bears on the question of the preservation of the power of writing when the power of speech is gone.

"To Mr. Edmund Allen, Sir,

It has pleased God this morning, to deprive me of the power of speech; and as I do not know but that it may be his further good pleasure to deprive me soon of my senses, I request you will on the receipt of this note, come to me, and act for me as the exigencies of my case may require.

I am sincerely yours, Samuel Johnson. June 17, 1753.

To the Reverend Dr. John Taylor. Sir,

It has pleased God, by a paralytic stroke in the night, to deprive me of my speech. I am very desirous of Dr. Helveticus's assistance, as

I think my care is not just remedy. Let me see you as soon as possible. Bring Dr. Hellander with you if you can; but come yourself at all events. I am glad you are so well, when I am so dreadfully attacked. I think by a speedy application of stimulants much may be done. I question if a vomit, vigorous and rough, would not move the organs of speech to action. As it is too early to send, I will try to recollect what I can, that can be suspected to have brought on this dreadful distemper.

I have been accustomed to bleed frequently for an anæmotic complaint, but have forborne for some time by Dr. Pepys’s advice, who perceived my left leg faring to well. I sometimes alternate a painful, or more properly an unpleasant oppressive constriction of my chest, by spitting, and have lately taken opium frequently, but the last, or two last times, in smaller quantities. My largest dose is three grains, and last night I took but two. You will suggest these things (and they are all that I can call to mind) to Dr. Hellander. I am, or Sam Johnson. June 17, 1781.

Though not describing his condition, I have given these two letters in full as they were written on the morning (early, or the next day) of the night in which he was attacked. The following letter describes his condition.

"Two days after he wrote thus to his uncle:

On Monday, the 16th, I sat for my picture, and walked a considerable way with little inconvenience. In the afternoon and evening I felt myself light and easy, and began to plan schemes of life. Then I went to bed, and in a short time waked and sat up, as has been long my custom, when I felt a confusion and indistinctness in my head, which lasted I suppose, about half a minute. I was alarmed, and prayed God, that however he might afflict my body, he would spare
my understanding. This prayer that I might try the integrity of my faculties, I made in Latin verse. The line, were not very good, but I knew them not to be very good; I made them easily, and concluded myself to be uninjured in my faculties.

Soon after, I perceived that I had suffered a paralytic stroke, and that my speech was taken from me. I had no pain, and so little dejection in this dreadful state, that I wondered at my own apathy, and considered that perhaps death itself, when it should come, would excite less horror than seems now to attend it. In order to move the vocal organs, I took two dram. Wine has been celebrated for the production of eloquence. I put myself into violent motion, and I think repeated it; but all was in vain. I then went to bed, and, strange as it may seem, I think, slept. When I saw light, it was time to continue what I should do. Though God stopped my speech, he left me my hand; I enjoyed a mercy which was not granted to my dear friend Lawrence, who now perhaps oversees me as I am writting, and rejoices that I have what he wanted. My first note was, unanimously to my servant, who came in talking, and could not immediately comprehend why he should read what I put into his hand. I then wrote a card to Mr. Allen, that I might have a direct friend at hand, to act, as occasion might require. In penning this note, I had some difficulty. My hand I knew not how nor why, made many letters. I then wrote to Dr. Boulton to come to me, and Mr. D. Heberden; and I went to Dr. Brockett, who is my neighbour. My physicians are very friendly, and give me great hopes; but you may imagine my situation. I have
so far renounced my vocal powers, as to repeat the Lord's Prayer with no very imperfect articulation. My memory, I hope, yet remains as it was; but such an attack produces solicitude for the safety of every faculty. A fortnight later, he was able to speak well but 'the nerves are weak,' he says, 'and I cannot continue discourse long.'

It is impossible, without a fuller history, to state exactly what power Dr. Johnson had lost. But we may presume that he had (on the negative side) at least lost the power of making himself understood by spoken language, and it is obvious that he did retain internal speech, and did retain the power of expressing himself in writing. Both of these faculties slightly defective, it is true, but insufficient to enable him to compose and criticise his Latin verse, or the one hand, and to give order to his dissent, on the other hand.

Upon these twelve cases, which I have quoted in this connection, I think it may safely be assumed that Dr. Johnson's victim that the speechless patient does not write. must, in a measure, be qualified. And this is only what might a priori be expected. Mr. de Ribot very clearly points out the inequalities that exist in the strength of a man's various memory, even in health. So that it is but natural that one may suffer more than another. He instance his great wonder in memory for musical sounds, which enables him to write out the minor key after hearing it played once in the Sistine Chapel. And again, the graphic memories of Horace Vernet and Gustave Doré, which enables them to paint portraits from memory. It is then easy to understand...
The statements of various writers that in aphasia its disturbance of speech, pantomime and writing are not equally profound - nor and not be, and do not progress pari passu. These remarks apply equally to Dr. Hughlings Jackson. His oft-repeated statement of the speechless patient's negative condition. These are that he

3. Cannot, in most cases, read at all, and

4. The power of making signs is impaired.

It might be supposed, from the quotation made above from Ribot, that power of making signs might alone be impaired. This condition, however, seems to be unknown. For, as we shall see when we come to Dr. Jackson's explanation of the speechless patient's positive condition, these signs are highly specialized or automatic and involuntary, in large part at any rate, and are therefore less affected.

Dr. Hughlings Jackson goes on to describe the positive condition of the aphasic patient. In regard to this, he makes four propositions. He can understand and remember what we say or read to him. This as we have seen is not true of those patients who are affected with word deafness.

2. His articulatory organs move apparently well in eating and in his occasional utterances. I remark here that in aphasic patients may be unable to produce the tones voluntarily, but may do so in order to pick up a crumb, or soon to tick his lips to facilitate the process.

3. His vocal organs act well. He sings. Of this there are
numinous cases recorded by Trousseau, Chant, or others; and

curiously enough, the patient may, in varying attitudes, hear and
saying quite clearly. In one instance a man who was completely
mute and speechless joined in singing the first verse of "I dreamt that I
strolled in marble halls" and then, by himself, sang the second
verse.

4. The aphasic patient smiles, laughs, frowns, as we have
seen. Dr. Jackson considers some of the expressions of the emotion as
really parts of the emotion itself.

Dr. Hammond directly denies Dr. Jackson's conclusion that what
is lost in aphasia is merely the voluntary power of using words
to express ideas. After quoting at-length a passage from Dr. Ferris's
West Riding Asylum report - he says - it is very evident, however,
that the view of Dr. Jackson thus enunciated and endorsed by Dr.
Ferris, is not at universal application to the phenomena of aphasia;
for though in some cases there is no loss of the memory of word but
merely a loss of the voluntary power to utter them, there are many other
cases in which the patient has lost the memory of words, and has not
lost the voluntary power to utter them. Thus, the person who speaks of
his "boots" as "tops," has not lost the voluntary power of saying 'boots,'
for he can utter the word when asked to do so, an act which would be
clearly impossible if he had no voluntary power to say boots. I have
witnessed several cases in which the patients could say any word they,

8. loc. cit. p. 220. 7. "Remarks on the Brain."
were told to say, but who could scarcely articulate a syllable when not prompted. The fact appears to be, that its only cases in which the voluntary power of articulation is lost, are those which are described in the present chapter as instances of alienic aphasia. I shall not attempt to argue this point, but merely remark, in passing, that it is in no sense to be inferred because a patient can repeat words, that he therefore has a power of uttering them voluntarily. Person may repeat what is said, automatically—or one might almost say reflexly—without Grange Stewart gives an amusing illustration of this in his chapter on aphasia. A barrister was prompted by some remark to add a clause to the petition of his speech, asking that the accused might be "whipped at the tail of a cart" after being found not guilty. But this automatic repetition may be found in persons perfectly healthy, such as sailors that are accustomed to repeat all orders given them. I have heard a young sailor bid "go aloft—go aloft, young man! and stay there all right, Peter!—Stay all right, young man!" It is hardly possible to say that a man actually has a power of using something, apart from the possession of that something itself. It is not, I think, a metaphor too far to say that a man has lost the power of paying his hotel bill, for example—if his pocket-book has been stolen. Though he may still mechanically give a small coin to an imposture beggar, and may have the power of paying on a bank note to his landlord if a friend should lend him one. 

1. Saccard, Chirurgie, Feb. 1875, p. 35. His explanation is given almost in Huxley's Text-Book, chap. xviii, xvii.
D. Bealby Jackson devote an article to the consideration of
exceptions to his first proposition, viz., that to the speaker,
patients' repetitive condition - namely, that he does not speak
at all. Dr. Jackson divides these into Recurring and occasional
utterances.

The recurring utterance, usually remain unaltered throughout
the course of the illness, but this is not invariably the case.
The recurring utterance, may be grouped under the following headings:

1. Simple Jargon. - such as "Gally," "maccoss," "consio," "Essor.

2. Words used singly without propositional meaning; here
are really jargon. e.g., 'one,' 'man,' or some oath as 'damn.'

3. Some phrase without propositional value as used in the
utterance though of highly propositional form. 'Come on me'
Left complete' or frequently an oath, such as, 'hell to pay,' in a
case recorded by Dr. Hammond, Somnology.

4. 'Yes,' and 'No.' may be retained. These words may be
used:
   a. as simple interjections.

b. meaning affirmation and rejection.

c. simply repeated when the patient is told to do so.

The occasional utterances may be similarly divided into:

1. Utterances which are not speech.

2. Utterances which are inferior speech.

3. Utterances which are real speech. Superiority
in which means precision of application to new relations.


b. loc. cit. pp. 208, 213.
D. Gintiap mentions a patient who could seldom or never repeat even its simplest things dictated to her, she occasionally said some words, and even short sentences in accident as 'He will come Saturday.' "Glob. heb. jun., vol. iii. 1794, p. 182."
things. Many examples of these occasional utterances are given by various authors. Dr. Jackson instance, patient who under the influence of emotion such as ‘Oh, dear! One patient said ‘damn’ when his daughter came in late one night.

2. of the ‘inferior’ speech utterance, Dr. Jackson gives an example in the case of a groom who said ‘Ho! Ho!’ to his horse. This was a distinct proposition though not in the propositional form of ordinary articulate language.

3. Some patients, otherwise completely speechless, occasionally surprise and delight their friends by utterance of high propositional value. The friends are apt to think that speech is about to be restored. The daughter of Dow, the patient, who said ‘damn’ when she came in late, was so pleased that she said she would always stay out late if it would only make her father talk.

These highly propositional utterances are of great interest but are difficult to explain. One man who could say only ‘poor!’ one day asked for his daughter and said ‘How is Alice getting on?’ Another patient in another of his inquisitive concern where he had left his tools, replied ‘master’s’. Another patient in the middle of some incomprehensible jargon, said ‘Surely you must know what I mean.’ Another patient was annoyed at the examination he was undergoing and exclaimed ‘That is all this bloody nonsense about?’ Many other examples might be given.

There is no demonstration by these cases that the patient retains organization for any other word than those he actually utters.” – Dr. Jackson (loc. cit. p. 222) "but is it a likely thing that
Trousseau's patient, who said 'merci' when a lady picked up his handkerchief, had just that word on a few such mots, left.

Dr. Jackson maintains that loss of speech follows the course of loss of nerve power generally, and he applies in detail to speech the principles he has enunciated elsewhere in regard to the evolution and dissolution of the nervous system. "Evolution," he says, "is a passage from the most to the least organised; that is, the process is from centres comparatively well organised, at birth up to that, the highest centres, which are continually organising through life. Evolution is a passage from the most simple to the most complex - from the most automatic to the most voluntary. The highest centres, the organ of mind, are the least organised, the most complex and the most voluntary. "Dissolution is the reverse of this process. It undergoes dissolution to be reduced to a lower level of evolution." He further applies and extends Dr. Brompton's hypothesis of the bilateral action of the brain, in highly organised, automatic movements, which permits there to go on after injury to one side of the brain. The application of these principles is tolerably simple until a certain point. He advances the hypothesis that words are in duplicate; the nervous arrangement for words used in speech lie chiefly in the left half of the brain, that the nervous arrangement for words used in understanding speech (and

*Grossian Lectures, 1854.*
in these ways) lie in the right also. The statement, he says, Latin is too abrupt. The mentality is dual: physically.

The unit of function of the nervous system is double the unit of composition. The speech possible by action of the right side of the brain is inferior. Thus when the right side of the brain is unjured the patient has word remaining. He has lost the memory of words serving in speech and retained the memory of words serving in other ways.

This theory readily explains the retention of emotional and intepretational language — the weeping when angry, the saying merci, or adieu or any others under appropriate circumstance. But does not explain the occasional highly propositional utterance, nor the returning utterance in propositional form such as ‘Come on to me’. Last complete, I want protection.’

Dr. Jackson suggests that these words were being said or were about to be said at the time the patient was attacked by his illness. This he maintains is a condition interfering with the process of dissolution. ‘Come on to me’ represents not only the last proposition an permanence but is to be looked on as on the physical side, a keeping up of activity (of a greater readiness to discharge) of certain nervous arrangements, which normally exist only temporarily and only on special occasions in particular combinations, and which in health soon go out of function (practically out of function, not actually). Certain nervous arrangements remain permanently in a state of discharge ability far above normal. This phrase ‘Come on to me’ was the
ultimacy of a signal man struck down by disease on the railway.
I cannot understand the ultimacy of a man hurt in a
street brawl: 'List Complete' that of a man whose illness came
on after some hard work in writing a catalogue. 'See see,'
that of a woman whose illness came on while riding.

D. Jackson, further, insists that the disease must in
no way be called the cause of these ultimacies. It merely
permits them, from the loss of control of a higher or a lower
centre. The disease in the left side permits the increased
dischargability of the right half of the brain.

In regard to that has just been said, in regard to known
arrangements going practically but not actually out of function,
he instances two cases in which operations remained in abeyance.
A groom taken ill while attending to his horse, on economic
consciousness began to hiss as grooms do at their work.
Similarly a lady taken ill while playing cards, remained
unconscious till the third day, when she suddenly asked 'What
is trumps.'

In explanation of the inversion of words or sentences,
that sometimes occurs aphasic, as well as in temporary
embarrassment of speech from emotion and so on — he
advance, what at first seems a somewhat startling proposition:
that images and words are subjectively revised
in an order, the reverse of that in which image, and word
are finally arranged — and from want of control, in aphasia,
or in the hurry of emotion, they, so to speak come over
prematurely. This proposition is however quite in accordance with phenomena observed in investigations of quite another sort. Dr. Jandel, among others, has made interesting observations in regard to the so-called "mirror writing" of (left-handed) idiots. He discusses this question of the action of the right side of the brain in automatic or "flanell Medical writing," he adopts Mr. Hyland's Jackson's theory, in explanation of the backward writing so often seen: "the operator is often quite unconscious of what he is writing; in that the action may, according to Dr. Jackson's dictum, be considered purely automatic. The less and less consciousness attends, the more and more they become automatic, subject and object propositions become as it were fused." It is impossible to follow out this subject in such a paper as this, but it seems probable that much light may yet be thrown on the process of speech by a careful scientific observation of the automatic phenomena observed in such methods or during a natural or artificially induced condition of hypnosis.

Aphasic patients, we have seen, may be able to copy writing though not able to read nor to write (copier themselves in writing). Some may even copy print into writing without understanding it at all. In this connection Dr. Jackson says, "the aphasic patient cannot express himself in writing because he cannot speak, but the nervous connections for these different images, which are named letters, are intact, and thus he can reproduce them as mere drawings, as he can the images, although with more difficulty, they derive, lacking

1. The list on the brain. 2. From Tof for Psych. Research at 1885 (May)
3. ?

3. Brown, loc. cit., p. 236
their accustomed stimulus, being less organised. He can copy writing and he can copy print into writing. When he copies print into writing obviously he derives the image of letters from his own mind (physically his own organisation) he does not write in the sense of expressing himself, because there are no words reproduced in speech to express.

This explanation does not hold good for cases of pure agraphia— that is cases in which the patient has lost the power of writing though he may speak perfectly, read aloud, draw figures (geometrical) copy writing and letters, write with the left hand and yet be unable to write with the right hand though all ordinary movements can be gone through with it. Such a case is described in detail in Dr. Bannard's volume. This patient suffered from right hemianopia but could read quite well. Such cases are undoubtedly very rare. The pathological lesion causing agraphia is possibly one occurring in the foot of the second left frontal convolution. Such a condition is difficult to understand. In such cases to which Dr. Jackson's explanation applies, it is easy to see that there would be no affection of other movements such as those of drawing, knitting, writing and so on.

Another condition, the considered as affecting to some extent the course of dissociation, is the rapidity - as also the gravity of the lesion taken in conjunction with the external circumstances.

It is usual in describing the process of speech to say that language must possess a subjective and an objective value, or must fulfil an expressive and an expressive function, thus applying to speech that hereditary sway of movements generally, when he tells of one having a dream of his arm being overthrown before he protests it. So 

2. Dr. Jackson says that every proposition occurring during activity of the left side of the brain is preceded by a revival of the words of it during activity of the right-half of the brain - subjective followed by objective. Verbalizing consists in the whole process: subject proposition plus object proposition. The subject proposition is probably a survival of the fitter; that is to say, of the internally fitter. Emotional, temporary, speechlessness may be due to this fittest struggle for equality the survival of the fitter, whose nearly balanced force are in conflict, or such a struggle may give rise to exhaustion of the centre.

In his explanation of the intellectual or mental process of speech, Dr. Broadbent adopts Dr. Bartlet's views with

some modifications. Quoting from Dr. Kant he says, "certain definite parts of the brain are called into operation action in mental operations, and these are always the same. The same parts as before are concerned in the retention of past impressions or ideas.

The several sense centres, at the base of the brain and in the medulla are connected each with its own set of cells in the cortex. These cells along with the sense centres form the perceptive centres. In the perceptive centres the primary impressions made upon the organs of sense are converted into "perceptions proper." Dr. Pardoe seems to give this process the term of 'apprehension,' borrowing the term from Kant.] that is to say, they receive their intellectual elaboration, and this elaboration implies an intimate cell fibre communication between each perceptive centre and every other perceptive centre, since one of the principal features of a perceptive act is that it tends to associate, as it were, into one state of consciousness, much of the knowledge which has been derived at different times and in different ways concerning any particular object of perception. Dr. Bovet seems to modify this by dividing the process into two parts. There is a primary or immediate perceptive act by which external causes such as are recognised by the form, colour, and so on. There is also a higher degree of elaboration in which by the combination of fusion
of perceptions derived from the various organs of sense a conception or idea of an object as a whole is obtained. This is a new and distinct process, and is usually accompanied by the affixing of a name to the object. Dr. Broadbent has made this clear by a schematic diagram. In this are mapped out the various sensory and intellectual centres, which are supposed to come into play in speech. He supposes that we have a sensory and motor department—a receptive and emissive; and that the one gives guiding impressions to the other. While higher centres employ the motor group, or diagrammatically this

where S. m. represent sensory or motor.

The cells set in action in speaking form a word group. Hypothetically located in the corpus striatum, guided by auditory impressions through the optic thalamus. The convolution of Broca may be considered the way out for intellectual speech through the higher centre is not localised. The auditory-perceptive or guiding centre may be located in the infra-racineal gyrus of the Sylvian fissure, which registers word as heard—as we have seen in treating of word deeper. Putting this in the form of a diagram we have

Where A = Audit. Centre
S = Speech
O. T. = Optic Thalamus
C. S. = Corpus Striatum

1. "Brain," vol. 1
Applying this, to disorders of speech we find that lesions of S. would cause simple aphasia, in which the patient understands and tries to speak, automatic speech would remain.

In lesion of the line of communication A-S, the patient would make mistakes in words of which he would, however, be conscious. In lesion of A. he would make similar mistakes unconsciously.

He then draws a centre from for the higher perception of which we have spoken, with its correlative motor or naming centre, with its correlative motor centre which he terms its proposition centre, in which names are set in a framework of the word for outward expression. In this a proposition is realised in consciousness and mentally rehearsed. It is in this proposition centre that Dr. Broadbent would localize the seat of the faculty of language, rather than in the convolution of Broca. Expressing this by a diagram we have V. the visual centre (located in the angular gyrus of Fessing) A the auditory centre (in the supramarginal gyrus of the Sylvian fissure) T. the tactile centre (in the uncinate gyrus)
If S be intact and P destroyed the patient cannot frame the simplest phrase, but can repeat word by dictation.

Conversely a proposition may be recalled in conscious but may not find expression.

If P is injured a patient may still be able to utter names, but cannot put them together—he has no syntax. A Broca's patient gives an example of this in the case of a gentleman who said, “Better America, last Boston, letter.” While if N is injured the patient has no memory for names.

As in a case already mentioned, one patient could talk well and repeat words, but could not name objects nor read even his own writing, in such a case we is damage. In this case quoted a lesion was found underlying the angular gyrus.

In lesion of A or AVC we have word deafness.

It probably lies in the sensory areas of the brain, P in the anterior part of the cortex. S may, as a proximal guess, begin foot of ascending frontal (first ascending parietal gyrus). P may be in Broca's convolution. N in the collateral lobule, or under surface of temporo-occipital near its junction with the occipital lobe, as fibers from all the perceptive centres converge to and in its grey cortex.

Reading would on the diagram be represented by connecting AV and possibly VC. When the act of reading becomes automatic the graphic symbols convey ideas directly.
to N. without the intervention of S or A probably. Dr. Broadbent would insist a centre B. for writing close to S. or may possibly be identical with S or controlled by a common higher centre. Dr. Broadbent has not seen any patient who could write and not speak and seems to doubt similar cases have occurred. I think however that some of the 12 cases I have quoted may be considered as conclusive evidence. Exeas as we have seen localised W in the foot of the 2nd frontal on the left side.

Such an attempt to explain cases of aphasia must after all bring us only to approximate conclusions, and enable us to form a sort of 'working' hypothesis till our knowledge of the subject is more accurate. Besides the tracks figured in the diagram there must be numerous others. For example, the patient Dupuy whose case is referred to on the page before this one - the patient who could not name objects at sight but could name them in ordinary conversation - could explain by peripheries that he knew what an object was which he was yet unable to name. There must therefore have been some track open from V. to S. through the "appreciative" centres - or as in Dr. Broadbent's diagram through N. to P. yet without as it were receiving any modification in the naming centre.

Professor Jerring Stenval's diagram is somewhat similar to Dr. Broadbent's though the names applied to the different various regions are somewhat different and a coordinating centre for speech in
inertia apart from the motor centre. This certainly makes its explanation of some ataxic cases more easy, but it seems doubtful whether two such downward tracts exist apart from each other. The diagram is so familiar in the Edinburgh School that I merely insert it without any explanation; though, in fact, from the naming of the parts of the diagram no explanation is necessary.

Nussbaum's diagram is much more complicated. It is constructed on the same principle so far, but in it the downward tracks pass through the word-seeing and word-hearing centres to the coordinating centres. I do not here reproduce it. It is to be found in Nussbaum's elaborate treatise on the disturbances of speech to which reference has

1. loc. cit. p. 279.
frequently been made in the course of this paper. Kussmaul also adds another perceptive-image centre to explain its acquisition of speech by deaf-mutes.

Charcot's diagram is somewhat similar to Kussmaul's. It has not the merit of clearness like that of Dr. Broca and Professor G. Stewart. It is figured in Dr. Bernard's work. The same diagram is employed by his helpers in his explanation of the phenomena of automatic writing. I give the diagram with the English names, and with the addition of letters which his helpers use, to formulate his results.
By means of these letters Mr. Hughes has composed some highly ingenious formulæ, so as to represent the various conditions in a concise form. This method is so far of use that it compels one to form a definite idea in his own mind of the kind of case with which he is dealing, but it is of little value for any further purpose. And it has the disadvantage of giving in a semi-algebraical or mathematical form, an opinion on a subject of which the very premises are in large part hypothetical— and consequently hypothetical conclusions may be taken for proved facts. He makes the letter with the dash (e.g., x') represent the right half of the brain. For example he lets \( x' + yx' + yv' \) represent normal speech; then \( x' + yy' + y'v \) represents pure aphasia; or \( x' + yy' + yv' \) represents pure word deafness; and \( xx' + uv \) represents congenital deafness.

It is doubtful if such formulæ could be applied successfully in the representation of some of the more complex cases.
Enough has been said, in the course of this paper, to show that no general formula can be given in regard to the mental condition of an aphasic patient. As in the case of the insane, each case must be judged of on its merit. Some aphasic patients are perfectly able to conduct their business - either by means of writing, or by giving answer to leading questions. Such patients would be quite capable of making a will. In a case of some word deafness, a patient might make his will in writing if there were not word blindness along with it. But a patient both word and deep might be quite incapable, though his intelligence and judgment might be little if at all impaired. I recently had the opportunity, by Dr. Judd's kindness of seeing the shorthand writer report of the evidence of a young man given in the court of Stemann. He had been completely aphasic as a child, and was at that time under Dr. Judd's care. His case was reported in the Thayer medical journal or Obstetrical journal for 1876. He went to a certain extent reeducated and could speak a little. His evidence was chiefly in the form of answers to leading questions. He was able to take the oath, repeating it after the judge word by word so he was unable to do so clause by clause. The case is of importance also from the point of view of prognosis. Permanent aphasia in children from disease of the left hemisphere is almost

1. Custer, Disease of the Brain, p. 125
unknown. The loss of speech rarely lasts longer than a week, then the child speaks almost as well as ever. Hence it is probable that speech processes go on more equally in the two hemispheres in childhood than they do in adult life. This statement must I think be taken with some reservation. Dr. Bernard describes at great length a case of aphasia occurring in a boy of 8. The case began after an attack of septicemia with otorrhea. It came on suddenly with a confusion after which the child was hemiplegic on the right side. His power of speaking more than two years later was very defective. Dr. Graves records a curious case of aphasia in a child of six, followed on recovery of speech a few days later, by dreadful stammering. This however entirely passed away on the onset of what seems to have been tuberculous laryngitis with hoarseness. I refer to the case partly to show how little seems to have been known of aphasia even so late as that time. Dr. Graves rather implies that the loss of voice was laryngeal in the first instance though he had lost all power of articulation. I have already referred to the onset of aphasia after extra-hypothalamic aphasia (not aphonia). Dr. Graves records a case, showing how guarded should be the prognosis in every case of aphasia even if at the time unaccompanied by paralytic phenomena. The case is that of a Genista who one day met an old friend from the country. He tried to ask for family news and to this the patient found himself speechless.

though he had a few moments before, been chatting with various friends. Satigo and right hemiplegia came on late on the same day. At the end of three weeks, he had partially recovered but in two months he died of apoplexy.

There are many varieties of affection of speech, which occur in the common diseases, due to lesions of the highest nervous system. We have for example the thick and articulation of casual paralysis. I have observed a somewhat similar indistinctness in a case of progressive muscular atrophy, which had advanced so far as to involve the muscles of the tongue, and then became stationary. In multiple sclerosis the speech is often of a scanning character. Kussmaul explains this by irregularity of the nervous impulses caused by their having to overcome an unaccustomed resistance.

In myxoedema also there is a scanning utterance. The speech may be much affected from disease of the medulla or pons, either occurring gradually, as in the progressive disease called bulbar paralysis, or coming on suddenly from afebrile lesions. Such a case is described by Dr. James. A lady, having a fit during dinner. She did not lose consciousness, but was quite speechless. There was no paralysis of the limbs but she swallow with difficulty and the saliva ran from her mouth (showing that her lips also were probably affected, though this may have been due to her inability to swallow).

1Quoted by Bastian. Brain as an Organ of Mind. p. 672.
She remained quite speechless. At her death two years afterward an old granular cyst was found in the tonsil. Even complete ablation of the tongue, however, does not cause so much disturbance of speech as might be expected. Such cases are mentioned by Dr. Annandale as having occurred in his own practice and that of his friend.

Kinnier, more causes of disturbance of speech in his treatise on that subject. More recently de la Tourette has described a very curious condition due apparently to instability or excessive irritability of the speech and other motor-centres. A case of this sort has been described by Dr. Raitt. In his patient the first condition observed was an involuntary movement of the right arm, accompanied by a sort of inarticulate cry, like (as it were) "clearing the throat." This gradually passed on to a more evident movement and its cry was replaced by an obscene oath. The character of the disease led de la Tourette to call the condition "aphonia.

In the winter of 72-73 there was a male patient in the ward of the Salpêtrière who exhibited a somewhat similar condition; he used suddenly to make a violent gesture with his right arm and give a loud shriek. M. Charett called the condition "chorea of the diaphragm." The shriek was inarticulate, but

1. Ms. note of clinical lecture.
She is often observed as attuned to. I am unable today.
Mr. Raiton says a somewhat similar condition among the
people of the Straits' settlements, where it is known as 'Latah.'
It also resembles the 'jumping mania' of the kamiburuRLRRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLRLR