a corset for any length of time. The respiratory murmur below the fifth rib was very faint compared with the sounds above, and these ladies found it impossible, as a rule, to move the strength 'spirometer' the fraction of a degree. From these facts, she concluded that the capacity of the chest had become limited, and the muscular fibre of the diaphragm impaired, by the unyielding walls of the corset-prison. Not very great compression upon the line of attachment of the diaphragm was required to interfere with its contractile power. Loss of strength in the abdominal muscles and diaphragm prepared the way for a slow and painful, if not instrumental, labor. Loss of respiratory capacity implied increase in rapidity of the heart's movements: this meant weakening of its force, and thus came the cold extremities and easily chilled skin so common in those who wore corsets. She had not been able to demonstrate the displacement of the liver spoken of, because doubtless the examinations were made with the corset off. With a large experience in treating girls suffering from displacements of the uterus (mainly retroversion and downward crowding), little could be done to relieve the sufferers until the corset was laid aside. Active muscular movements and corsets were not compatible, and unless the corset and its equivalent, tight clothing, were discarded, she was not sure but girls were better off without active physical exercise. What could we substitute for the corset, which, without producing pressure or displacement, would give the trim and tidy look so much admired by the sterner sex? A good dressmaker had more to do with this matter than the corset had. An underwaist without bones, with skirts snugly fastened to it; a dress-waist well shaped, containing a few bones, and loose enough to permit a long breath without limitation, — would make nine girls out of ten look just as trim and tidy as a corseted waist. If something more supporting was demanded, the 'Ferris waist' was all that was required. Without steels in front, and without bones, if worn loosely with the skirts attached, it might be accounted healthful. Dr. R. G. Eccles spoke of the comfort women derived from the corset. He had noticed that the more intelligent the women, the more they were corset-wearers. Dr. Jerome Walker spoke of the evils of corset-wearing, among which he mentioned the shallow breathing as particularly objectionable. Dr. William Anderson thought if we educated the women to despise the corset, it would disappear. The president remarked that we did not use our chests to their full capacity except when making unusual exertion. A woman under ordinary circumstances had her breathing but little restricted. If the servant laced herself in her ordinary working costume as she did on Sunday, she would suffer severely.

MENTAL SCIENCE.

The Mechanism of Attention.

M. TH. RIBOT, whose useful compilations on English and German psychological movements, on heredity, on the diseases of memory, of will, and of personality, have gained for him a world-wide reputation, contributes to the *Revue Philosophique* (of which he is the editor) an interesting and convenient account of the mechanism of the processes of attention.

Attention is not so simple a phenomenon as popular analysis makes it. It is not always one and the same state, but varies indefinitely in intensity, from the momentary attention necessary to brush off a fly, to the most complete absorption. This intensity is gained either by the accumulative results of a long-continued strain, or by an intense focusing of all energies to one group of sensations. Regarding attention thus as a state varying in degree, we are ready to make a distinction on which M. Ribot lays much stress; namely, between spontaneous and voluntary attention. Our notion of attention is derived almost exclusively from the latter. Attention we regard as a purposive effort. But this is really not the typical nor the most important aspect of attention. The former has been much neglected, and to it M. Ribot devotes his first article. The distinction between the two forms of attention is easily made clear. The first is a natural impulse to let such things make an impression upon us as excite our interest. The second is an artificial product of civilization, that we have learned at school. To look at flowers and be impressed by them is a result of spontaneous attention; to dissect and minutely analyze their parts, of voluntary attention. The main characteristic of attention, and especially of its typical, natural form, now under discussion, is its motor aspect. As Maudsley puts it, whoever is incapable of controlling his muscles is incapable of controlling his attention. All attention, however, is, in a sense, an abnormal, exceptional state. Such states cannot last long, because they are opposed to the ever-present change that is the law of life. We see this abnormality when attention is carried to the extreme, producing clouding of the mind, a mental void, or vertigo. Their analogy with fixed ideas and states of ecstasy is also close. The normal process of 'cerebrising' consists of an ever-changing focusing on one set of impressions, then a diffusion of these to give place to another group, and so on in an ever-successive lighting and skipping; the laws of association governing the order and connection of the several foci. Normal thought is thus a 'poly-ideism,' while attention is a 'mono-ideism.' It is a focus concentrating into itself all the available energies; it is the substitution of unity for diversity. Attention is further characterized by being directed towards an end: it is not a subjective process, but is adaptive, convergent. If a definition be desirable, we might define attention as "an intellectual mono-ideism with spontaneous or artificial adaptation of the individual."

Spontaneous attention is well seen in children and in the higher animals. Its cause is universally an *emotional* state. It is only the sensation-exciting, the interesting, the agreeable or disagreeable, that is naturally attended to. An animal incapable of feeling pleasure and pain would by that fact be incapable of attention. This general fact is exemplified in the biographies of great men, showing in some cases how the hero of the tale is for a long while restless, listless, until he falls upon the occupation that interests him, enthuses him, and brings out his genius by focusing his attention to a single line of thought. This passion for work has its analogue in other less desirable passions. The drunkard's attention is critically intense in the presence of the glass. But these intense states cannot endure long, and they only last as long as they do because a small amount of flitting really goes on, continuous as the state seems to us.

The physical conditions and accompaniments of attention are of great importance. The general law under which they are to be considered is that there is no thought without a tendency to its expression in motor terms. Thought is initial action. The motor expressions of attention are visible in three directions, — the vaso-motor phenomena, the respiratory phenomena, and the expressional phenomena. The first is recognized in the increase of blood in certain parts of the brain under mental work, as ascertained by direct experiments of Mosso and others. The slightest mental strain produces this result. The second is characteristic of the attitude of attention. The breath is slowed or held; sighs occur; and all this suggests the abnormality of the process. The third kind of movements are psychologically the most interesting; and many theories, notably that of Darwin, have been proposed to explain their origin. Duchenne experimented by applying electrical stimuli to muscles of etherized patients, and noting the facial expression thus aroused. He regarded the contraction of a single muscle as characteristic of one emotion. The frontal muscle furrowing the forehead is the muscle of attention; the orbiculars contracting the orbital space and lowering the eyelid of reflection, and so on. The motor expressions will be different according as the attention is directed inwards (reflection, contemplation) or outwards, as is usually the case. The motor expressions of the two are opposed: in the one the forehead is lowered, in the other the eyelid is lowered, the mouth closed as in effort, and so on. Darwin calls the attitude of reflection that of difficult vision turned inwards. The general attitude of attention is immobility, a tendency to unity of action, to convergence. It is a concentration of both motions and thoughts; and the degree of attention is inversely to the amount of motion. An attentive audience is quiet: an inattentive one shuffles and moves in a hundred ways.

To this rule there is an apparent exception in the common habit of walking, beating, etc., when deep in thought. This is to be accounted for by the increase of brain-activity thus brought about. Such movements are dynamogenic, re-enforcing, arousing the motor centres, and thus adding to the available energy.

The accompanying motions of attention are not merely signs of the former, but are essential, constituent factors of it. Suppress the expressive movements, and you suppress the whole process. The fundamental *rôle* of these movements is to keep up and re-enforce the attentive consciousness. The brain in attention acts both as an intellectual and as a motor organ.

A special form of spontaneous attention is surprise, and it is simply an exaggerated form of it. Descartes has given a good account of it, recognizing (though in other terms) the increase of nervous influxes that accompany it, the direction of energy towards muscles, and the typical facial expression. Surprise is a shock caused by the unexpected, a sort of emotional hiatus. This lasts until the object that caused the surprise is apperceived, recognized, adapted to. In surprise one feels much, and knows little; and the intense emotion rivets the attention. On the physical side the symptoms are exaggerated, the eyelids are widely opened,[1] perhaps the mouth too.

The utility of attention in the struggle for life is evident. The moment differentiation is clear, one part of the organism concentrates the energy and arouses a rudimentary attention. Riccardi places the origin of attention in the arthropods. The attention gets centred upon the most perfect sense in the animal, whichever that is. In the higher animals attention is marked, and in all such as play, showing thereby a surplus of energy, there is also an attention to objects not directly useful in the struggle for existence. This is the higher form of attention, equally evident in children.

In a succeeding article. Professor Ribot will give a similar exposition of voluntary attention.

PRIMITIVE MIND. — An interesting glimpse into the thought processes of unenlightened peoples is furnished by the following observation of the Ainos (a degenerate Japanese tribe distinguished for their long growth of hair) during the recent eclipse. The Aino is said not to be imaginative, but, on being shown the eclipse through a smoked glass, he cried out that the sun was fainting away and dying. A silence ensued, broken by an exclamation of fear that the sun would dry up. They brought water and sprinkled it upwards towards the sun, crying, "O god, we revive thee! O god, we revive thee!" Some squirted the water upwards with their mouths, some threw it up with their hands. A group of women and girls sat down with their heads between their knees, as if expecting some calamity. Their tradition with regard to the eclipse says that "when my father was a child, he heard his old grandfather say that his grandfather saw a total eclipse of the sun. The earth became quite dark, and shadows could not be seen; the birds went to roost, and the dogs began to howl. The black, dead sun shot out tongues of fire and lightning from its sides, and the stars shone brightly. Then the sun began to return to life, and the faces of the people wore an aspect of death; and, as the sun gradually came to life, these men began to live again." Otherwise they have no theory of the eclipse, but their personification of the phenomenon is evident.

EXPLORATION AND TRAVEL.

Wissmann's Expedition across Africa.

LIEUTENANT WISSMANN, whose journeys in the Kongo basin won him a well deserved fame as a traveller and energetic explorer, has just returned from his second expedition across the African continent. In the spring of 1886 he started from Angola for Luluaburg, a station of the Kongo Association which is situated in the empire of the Muata Yambo. Since Pogge's first journey in 1876, there have been six Muata Yambos, and, as at the death of the ruler the capital is changed, six capitals of the empire. We gave a report of Wissmann's expedition from Luluaburg to the Baluba country in No. 228 of *Science*. On his return from this excursion, he found one building of the station, which contained twenty-one rooms, burnt down, and the commander sick with malaria. His description of the station is of some interest. It consists of a number of houses for the officers of the station, barracks, a house for twelve women, stables, and a prison. The latter is called the cold house,' as it is not permitted to have a fire in it during the night, — a regulation which is much feared by the negroes, the nights being very cool on the high plateau. The station is protected by a stockade, and a *glacis* three hundred feet in width. The roads in the neighborhood of the station are fifteen feet wide, and kept very clean. About two thousand feet from the station a village of the Bassilange is situated.

Wissmann's expedition, when starting from Luluaburg in October, 1886, consisted of eighty-nine persons, among whom were an interpreter, a Zanzibari, and thirteen Angola men, while the rest were Bassilange. The number of people, however, rapidly increased to about one thousand, as the Lukugesha, the empress of the Muata Yambo Empire, and the son of Kalamba, with their followers, joined the expedition. When they arrived on the Lubi, an excursion into the country of the Benangongo, who live on the right bank of the river, was made. Then the river was followed to its confluence with the Sankuru, which was crossed below the mouth of the Lubi. It was originally Wissmann's intention to explore the country northeast of this river, which forms the watershed between the Sankuru and the Kongo. He found, however, the state of affairs in the country east of the Sankuru so much changed since the time when he visited it first, four years ago, that he was unable to carry out his purpose. While formerly the cowry was the principal object of barter, now guns and ammunition were in demand. The slave-trade is flourishing. The chiefs of the Bassonge and Bassenge, frequently supported by slave-traders, make raids upon the neighboring tribes in order to procure slaves. These are bartered to the traders for guns and ammunition, or for ivory to the Bakuba, who buy the women for their household, the men for being sacrificed at burials. A short time before Wissmann's arrival a chief of the Bakuba had died, and two hundred slaves were killed when he was buried. Travelling eastward, Wissmann crossed a vast belt of primeval forest which is inhabited by Batetela and the dwarfish Watwa. The woods are almost void of large animals, and even birds are scarce. On the Lukassi the expedition was attacked by the natives, who killed several persons with their poisoned arrows. But after a lively skirmish the natives were driven off, and, when the expedition reached their villages, they were found deserted. During the month of January, 1887, Wissmann crossed a territory depopulated by war and small-pox. The country of the industrious Beneki, whom he visited on his first journey, he found entirely devastated. Famine and small-pox prevailed among the members of the expedition, and it was not until the Lomami was crossed that matters became more favorable. At last Nyangwe was reached. Wissmann found the Arabs of this place in a state of great excitement on account of the events at Stanley Falls. Nevertheless he succeeded in returning the Bassilange to their native country, but Wissmann himself had to give up the hope of further explorations, and proceeded on the well-known route to the Tanganyika and by way of Lake Nyassa to Zanzibar, whence he returned to Europe.

The results of this expedition are not so important as it was hoped they would be when Wissmann started from Luluaburg. An expedition from the Kongo southward, or from Luluaburg northeastward, is what is wanted to give us a more thorough knowledge of the hydrography of Central Africa.

THE HUDSON BAY EXPEDITION OF 1886. — Lieutenant Gordon's report of the last expedition of the 'Alert' to Hudson Bay makes it clear that all hopes of establishing a trading-route from England to the west coast of Hudson Bay must be abandoned. The navigation of Hudson Strait proved extremely dangerous on account of the prevailing fogs, the strong tides, and the narrowness of the waters, but principally on account of the heavy ice of Fox Basin, which frequently obstructs the western entrance of the Strait, and of the faulty working of the compass. Besides, vessels navigating these waters must be fortified for meeting the ice, and must not be larger than two thousand tons, because a larger ship would be somewhat unwieldy, could not make such good way through the loose ice, and, being unable to turn so sharply, she would get many a heavy blow, that a smaller ship would escape. Gordon supposes that navigation can be opened between the 1st and 10th of July, and that the closing of the season would be about the first week of October. These results of Lieutenant Gordon's experience agree exactly with what was maintained by all experts when the scheme was first propounded; but at that time their

[1] That this is instinctive is borne out by the fact that it occurs in those blind from birth, and in whom opening the eyes could not thus increase sensation.