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THE WILL.¹

BY PROFESSOR TH. RIBOT.

After having followed step by step the dissolution of the will, the fundamental result which has appeared to us to spring from it is that it is in a co-ordination variable in complexity and degree; that this co-ordination is the condition of the existence of all volition, and that, according as it is totally or partially destroyed, volition is annihilated or impaired. It is upon this result that we would now like to insist, confining ourselves to brief indications on certain points, as it is not our aim to write a monograph of the will.

1) Let us examine in the first place the material conditions of this co-ordination. The will, which in some privileged persons attains a power so extraordinary and does such great things, has a very humble origin. This is found in that biological property inherent in all living matter and known as irritability, that is to say, reaction against external forces. Irritability—the physiological form of the law of inertia—is in some wise a state of primordial indifférentiation whence shall spring, by an ulterior differentiation, sensibility properly so called and motility, those two great bases of psychic life.

Let us remember that motility (which alone concerns us here) manifests itself, even in the vegetable kingdom, under divers forms: by the movements of certain spores, of the sensitive plant, of the *Dionœa*, and of many other plants to which Darwin has devoted a well-known work.—The protoplasmic mass, homogeneous in appearance, of which certain rudimentary beings are exclusively composed, is endowed with motility. The amœba and the white corpuscle of the blood move ahead little by little by the aid of the processes which they emit. These facts, which may be found described in abundance in special works, show us that motility appears long before the muscles and the nervous system, even in their most rudimentary form.

We need not follow the evolution of these two instruments of improvement through the animal series. Let us merely note that the researches on the localisation of the motor centres, so important in the mecha-

nism of the will, have led some savants to study the state of these centres in the newly born. "This investigation, very carefully made by Soltmann, in 1875, has furnished the following results. In rabbits and dogs there exists immediately after birth no point in the cerebral cortex the electric irritation of which is capable of producing movement. It is only on the tenth day that the centres for the anterior members develop. On the thirteenth day the centres for the posterior members appear. On the sixteenth, these centres are already quite distinct from each other and from those of the face. One conclusion to be drawn from these results is, that the absence of voluntary motor direction coincides with the absence of the appropriate organs, and that, in measure as the animal becomes more master of its movements, the cerebral centres in which the elaboration of will takes place acquire a more manifest independence.¹

Flechsig and Parrot have studied the development of the encephalon in the fœtus and the infant. From the researches of the latter² it appears that, if one follows the development of the white matter of an entire hemisphere, it can be seen to rise successively from the peduncle to the optic thalami, then to the internal capsule, to the hemispheric centre, and finally to the cerebral mantle. So those parts whose development is the slowest have the highest functional destiny.

The formative period passed, the mechanism of volitional action appears to be constituted in the following manner: the incitation starts from the regions of the cortical layer called motor (parieto-frontal region), and follows the pyramidal fasciculus, called *voluntary* by some authors. This fasciculus, which consists in the grouping of all the fibres arising in the motor convolutions, descends across the oval centre, forms a small part of the internal capsule, which, as we know, penetrates into the corpus striatum, "like a wedge into a piece of wood." This fasciculus follows the cerebral peduncle and the medulla, where it undergoes a more or less complete decussation, and passes down the opposite side of the spinal cord, thus constituting a great commissure between the motor convolutions

¹ *Dictionnaire encyclopédique des sciences médicales*, François-Franck, article "Nerveux," p. 595.

² *Archives de physiologie*, 1879, pp. 595-520.

¹ Second extract from our new authorised translation of M. Ribot's *Diseases of the Will*, just published.

and the grey matter of the cord from which the motor nerves are given out.¹ This rough sketch gives some idea of the complexity of the elements requisite for volitional action and the intimate solidarity which unites them.

There are, unfortunately, some differences of interpretation regarding the real nature of the cerebral centres whence the incitation starts. To Ferrier and many others they are motor centres, in the strict sense; that is to say, that in them and by them the movement commences. Schiff, Hitzig and Nothnagel, Charlton Bastian, and Munk have given other interpretations which are neither equally probable nor equally clear. In general, however, they amount to a regarding of these centres as rather of "a sensory nature," the motor function proper being relegated to the striated bodies. "The nervous fibres that descend from the cerebral cortex, in higher animals and in man, down to the corpora striata, are in their nature strictly comparable with the fibres connecting the 'sensory' and the 'motor' cells in an ordinary nervous mechanism for reflex action."² In other words, there are supposed to exist in the cerebral cortex "circumscribed regions the experimental excitation of which produces in the opposite side of the body determinate localised movements. These points seem as if they should much rather be considered as centres of *voluntary association* than as motor centres, properly so called. They would in this view be the seat of incitements to voluntary movements and not the true points of departure of the motion. They ought rather to be assimilated to the peripheral organs of sense than to the motor apparatus of the anterior cornua of the medulla. . . . These centres would then be *psycho-motor*, because by their purely psychic action they command veritable motor apparatus. . . . We believe that the different points indicated as motor centres for the members, the face, etc., correspond to the apparatus which receive and transform into *voluntary* incitation the sensations of peripheral origin. They would thus be volitional centres and not true motor ones."³

Notwithstanding this pending question, the solution of which concerns psychology at least as much as physiology, and in spite of disagreements in detail that we have neglected, especially the uncertainties regarding the function of the cerebellum, we may say with Charlton Bastian that, "if since Hume's time we have not learned in any full sense of the term 'the means by which the motion of our bodies follows upon the command of our will,' we have at least learned something as

to the parts chiefly concerned, and thus as to the paths traversed by volitional stimuli."¹

2) In examining the question on its psychological side, volitional co-ordination assumes so many forms and is susceptible of so many gradations that only its principal stages can be noticed. It would be natural to begin with the lowest; but I think it useful, for the sake of clearness, to follow the inverse order.

The most perfect co-ordination is that of the highest wills, of the great men of action, whatever be the order of their activity: Cæsar, or Michael Angelo, or St. Vincent de Paul. It may be summed up in a few words: unity, stability, power. The exterior unity of their life is in the unity of their aim, always pursued, creating according to circumstances new co-ordinations and adaptations. But this outer unity is itself only the expression of an interior unity, that of their character. It is because they remain the same that their end remains the same. Their fundamental element is a mighty, inextinguishable passion which enlists their ideas in its service. This passion is themselves; it is the psychic expression of their constitution as nature has made it. So all that lies outside of this co-ordination, how it remains in the shade, inefficacious, sterile, forgotten, like a parasitic vegetation! They present the type of a life always in harmony with itself, because in them everything conspires together, converges, and consents. Even in ordinary life these characters are met with, without making themselves spoken of, because the elevation of aim, the circumstances, and especially the strength of the passion, have been lacking to them; they have preserved only its stability.—In another way, the great historic stoics, Epictetus, Thræseas, (I do not speak of their Sage, who is only an abstract ideal,) have realised this superior type of will under its negative form,—inhibition,—conformably to the maxim of the school: Endure and refrain.

Below this perfect co-ordination, there are lives traversed by intermission, whose centre of gravity, ordinarily stable, nevertheless oscillates from time to time. One group of tendencies makes a temporary secession with limited action, expressing, so far as they do exist and act, one side of the character. Neither for themselves nor for others have these individuals the unity of the great wills, and the more frequent and complex in nature are these infractions of perfect co-ordination, the more the volitional power diminishes. In reality, all these degrees are met with.

Descending still lower, we reach those lives by double entry, in which two contrary or merely different tendencies dominate in turn. There are in the individual two alternate centres of gravity, two points of convergence for successively preponderating but only

¹ Huguenin, *Anatomie des centres nerveux*, (translated from the German by Keller), Brissaud, *De la contracture permanente des hémiplegiques*, 1880, p. 9, et seq.

² Charlton Bastian, *Brain as an Organ of the Mind*, chapter xxvi.

³ François-Franck, loc. cit., pp. 577, 578.

¹ Loc. cit.

partial co-ordinations. Taking everything together, that is perhaps the most common type, if one looks around one, and if one consults the poets and moralists of all times, who vie with each other in repeating that there are two men in us. The number of these successive co-ordinations may be still larger; but it would be idle to pursue this analysis further.

One step more, and we enter into pathology. Let us recall the sudden irresistible impulses which at every moment hold the will in check; it is a hypertrophied tendency which continually breaks the equilibrium, and the intensity of which is too great to permit it any longer to be co-ordinated with the others; it goes out of the ranks, it commands instead of being subordinated. Then when these impulses have come to be no longer an accident but a habit, no longer one side of the character but the character itself, there are henceforth only intermittent co-ordinations; it is the will that becomes the exception.

Lower still, it becomes a mere accident. In the indefinite succession of impulses varying from one minute to the other a precarious volition finds with difficulty at long intervals its conditions of existence. Only caprices then exist. The hysterical character has furnished the type of this perfect *incoördination*. Here we reach the other extreme.

Beneath this there are no more diseases of the will, but an arrest of development which prevents it from ever arising. Such is the state of idiots and imbeciles. We will say a few words regarding them here in order to complete our pathological study.

"In profound idiocy," says Griesinger, "efforts and determinations are always instinctive; they are chiefly provoked by the need of nourishment; most frequently they have the character of reflexes of which the individual is hardly conscious. Certain simple ideas may still provoke efforts and movements, for example, to play with little pieces of paper. . . . Without speaking of those who are plunged in the profoundest idiocy, we ask ourselves: Is there in them anything that represents the will? What is there in them that can will? In many idiots of this last class the only thing that seems to arouse their minds a little is the desire to eat. The lowest idiots manifest this desire only by agitation and groans. Those in whom the degeneracy is less profound move their lips and hands a little, or else weep: it is thus that they express a desire to eat. . . . In slight idiocy the foundation of the character is inconstancy and obtuseness of feeling, and weakness of will. The disposition of these individuals depends upon their surroundings and the treatment they receive: it is docile and obedient when they are taken care of, ill-natured and malicious when they are badly treated."¹

Before bringing this subject to an end, we will again remark that if the will is a co-ordination, that is to say a sum of relations, it may be predicted *a priori* that it will be produced much more rarely than the simpler forms of activity, because a complex state has much fewer chances of originating and enduring than a simple state. And such are the real facts in the case. If in each human life we count up what should be credited to the account of automatism, of habit, of the passions, and above all of imitation, we shall see that the number of acts that are purely voluntary, in the strict sense of the word, is very small. For the majority of men, imitation suffices; they are contented with what *has been* will in others, and, as they think with the ideas of the world at large, they act with its will. Between the habits which render it useless and the maladies that mutilate or destroy it, the will, as we have said above, must be taken as a happy accident.

Is it necessary, finally, to remark how close a resemblance there is between this increasingly complex co-ordination of tendencies which forms the different stages of the will, and the increasingly complex co-ordination of perceptions and images which constitutes the various degrees of the intellect, one having for its basis and fundamental condition the character, and the other the "forms of thought"; both being a more or less complete adaptation of the being to its environment, in the order of action or in the order of knowledge?

* * *

We are now prepared for the general conclusion of this work, already indicated several times in passing. It will illuminate, I trust, with a retrospective light the road which we have traversed.

Volition is a final state of consciousness which results from the more or less complex co-ordination of a group of states, conscious, subconscious, or unconscious (purely physiological), which all united express themselves by an action or an inhibition. The principal factor in the co-ordination is the character, which is only the psychic expression of an individual organism. It is the character which gives to the co-ordination its unity,—not the abstract unity of a mathematical point, but the concrete unity of a consensus. The act by which this co-ordination is made and affirmed is choice, founded on an affinity of nature.

The volition that subjective psychologists have so often observed, analysed, and commented upon is then

Father Sollier: *Psychologie de l'idiote et de l'imbecile*. It will be seen that in them the will cannot be formed because the conditions of its existence are lacking. The atrophy of the intellectual and affective faculties renders the apparition of voluntary activity impossible: which proves once more that it is not a primordial "faculty," but an acquired and complex state resulting from an evolution. These weak-minded persons cannot go beyond the period of reflexes, affective and intellectual; the world of will is a promised land into which they will never enter.

¹Griesinger, *Traité des maladies mentales* (translated from the German), pp. 433, 434. For a complete study of the question consult the recent work by

for us only a simple state of consciousness. It is merely an effect of that psycho-physiological activity, so often described, only a part of which enters into consciousness under the form of a deliberation. Furthermore, *it is not the cause of anything*. The acts and movements which follow it result directly from the tendencies, feelings, images, and ideas which have become co-ordinated in the form of a choice. It is from this group that all the efficacy comes. In other terms,—and to leave no ambiguity,—the psycho-physiological labor of deliberation results on the one hand in a state of consciousness, the volition, and on the other in a set of movements or inhibitions. *The "I will" testifies to a condition, but does not produce it*. I should compare it to the verdict of a jury, which may be the result of a very long criminal examination, and of very passionate pleadings, and which will be followed by grave consequences extending over a long future, but *which is an effect without being a cause*, being in law only a simple statement.

If one insists on making of the will a faculty, an entity, all becomes obscurity, perplexity, contradiction. One is caught in the snare of a badly stated question. If, on the contrary, we accept the facts as they are, we disembarass ourselves at least of factitious difficulties. One does not have to ask oneself, like Hume and so many others, how an "I will" can make my members move. This is a mystery which need not be cleared up, since it does not exist, as volition is in no degree a cause. It is in the natural tendency of feelings and images to express themselves in movements that the secret of acts produced should be sought. We have here only an extremely complicated case of the law of reflexes, in which, between the period called that of excitation and the motor period there appears a most important psychic fact—volition—showing that the first period is ending and the second beginning.

Let it be remarked also how easily that strange malady called abulia can now be explained, and with it the analogous forms considered above,¹ and even that mere weakness of will, scarcely morbid, so frequent among persons who say that they will and yet do not act. It is because the individual organism, the source from which all springs, had two effects to produce and produces only one of them: the state of consciousness, choice, affirmation; while the motor tendencies are too weak to express themselves in acts. There is sufficient co-ordination, but insufficient impulse. In irresistible acts, on the contrary, it is the impulse which is exaggerated, and the co-ordination which grows weak or disappears.

We owe, therefore, to pathology two principal results: one, that the "I will" is in itself wholly without

efficacy in causing action; the other, that the will in the rational man is an extremely complex and unstable co-ordination, fragile by its very superiority, because it is "the highest force which nature has yet developed—the last consummate blossom of all her marvelous works."¹

INSTINCT AND INTELLIGENCE IN CHICKS AND DUCKLINGS.

A CONTRIBUTION TO ELEMENTARY PSYCHOLOGY.²

BY PROF. C. LLOYD MORGAN.

In my "Animal Life and Intelligence" I quoted some of Spalding's statements as to the intelligence of young birds. I then received a letter from my friend, Mr. T. Mann Jones, informing me of observations of his own which did not accord with those which I quoted, and expressing some scepticism as to the existence of what he termed "the philosopher's chick." I therefore determined to observe for myself, and the following paper contains some account of my observations, which should be compared with those of Douglas Spalding in *Macmillan's Magazine* for February, 1873, and those of Professor Eimer in his "Organic Evolution" (English Translation, p. 245). I desire to express my acknowledgements to Mr. Mann Jones for his suggestions and criticisms.

The eggs were incubated under the hen until about the third day before hatching, when they were transferred to an incubator. After hatching, the young birds were left in the drawer of the incubator for from twelve to twenty hours. They were then kept under observation in a small pen surrounded with wire netting in my study. There was thus no influence of adult birds. I was their only foster-mother. I shall describe the observations under the head of the day of chick or duck life—first day, second day, and so on—dating from their removal from the incubator drawer.

FIRST DAY.—Chicks.—On opening the drawer of the incubator the newly-hatched birds are often seen to huddle together and to try and burrow under each other. Experiments on the co-ordination for pecking show that any small, conspicuous object is struck at. The aim was seldom quite correct, the tendency being apparently to strike somewhat short. Moving the object a little with a long steel pin caused it more readily to catch their eye. It was generally seized at the third or fourth stroke, but a little awkwardly, and was not always successfully swallowed. Flies, from which a portion of their wings had been removed, were followed as they ran, and were seized at from about the seventh to the twelfth stroke. The chicks pecked persistently at their own and each other's toes and at the bright bead-like eyes of their yellow neighbors, also at excrement, shaking their heads and wiping their bills.

Ducklings.—The pecking co-ordination was imperfect. When a piece of white egg was seized it was mumbled rapidly and shaken out of the bill unswallowed. Towards the close of the day they began to swallow what they seized, but the pecking co-ordination was not quite perfect. They were at first very unsteady on their legs (more so than the chicks) and tilted over backwards on to their tails. One scratched its head, but toppled over, the double co-ordination of standing on one leg and scratching its head was more than it could manage. They walked several times through the water placed in a shallow tin, but took no notice of it. I dipped the beak of one of them in the water; it then drank repeatedly, shovelling up the water with characteristic action. Presently the others imitated the action and drank freely. I dropped,

¹ Maudsley, *The Physiology of Mind*, p. 456.

² This article, sent to us by the author, was published in Vol. IV, No. 45, of *Natural Science*, of London. It is so instructive and of such great interest that we deem a republication of it justified, that it may reach as large a circle of readers as possible.

¹ In the first chapter of *The Diseases of the Will*, from which this article is extracted.

at different times, two ducks in a tepid bath. They kicked vigorously and excitedly, dropping their excrement, but in a minute swam about with easy motion, pecking at marks on the sides of the bath.

SECOND DAY.—Chicks.—Several ran repeatedly through the water in a shallow tin, but took no notice of it. Then, after about an hour, one of them standing in the water pecked at its toes. It lifted its head and drank freely with characteristic action. Another subsequently pecked at a bubble near the brim and then drank. The stimulus of water in the bill at once led to the characteristic responsive action. Others came up and pecked at the troubled water; they, too, then drank. Later on one was running and toddled into the tin; it stopped at once and drank. Wet feet seemed to suggest drinking by association. I placed two winged flies before them. One chick seized a fly at the first stroke. Another followed the second fly and made three pecks at it, but the other chick rushed in and caught it at the first stroke. A large winged fly thrown among other chicks was approached by one bird which gave the danger note (a very characteristic sound). Subsequently the same chick followed it and caught it after several bad shots. They pecked about equally at four kinds of grain, millet, canary, groats, and pari; but swallowed more of the millet. They also pecked at and swallowed sand grains. I took one of the chicks and put it down near a young cat. The bird showed no signs of fear.

Ducklings.—Both ducks made at once for water in shallow tin, drank, and squatted down in it. They ate keenly of white of egg, swallowing large morsels, the pecking co-ordination being nearly accurate. Both scratched their heads occasionally and toppled over. They preened the down, especially of the breast, in characteristic fashion; they also applied the bill to the base of the tail and rubbed the sides of their heads along the back in quite approved duck fashion. They stood up, stretching out their necks and flapping their wings, sitting down on their tails from imperfect co-ordination. They showed much less accuracy of aim than the chicks in catching running flies. The abortive attempts were numerous. They ate their own and chicks' excrement freely and showed little sign of disgust. (In South Africa young ostriches are often supplied with the droppings of the old birds, for medicinal purposes. So I was informed.)

THIRD DAY.—Chicks.—The chicks pecked excitedly at flies placed in an inverted tumbler, but failed to catch them on the wing when the insects were allowed to escape. They still peck at any small objects, especially bright ones, but show more discrimination in swallowing. They run to one's hand when one pecks on the ground with one's finger or a pencil, simulating the action of a hen. One can thus induce them to seize objects which they would otherwise leave untouched. They will always run to nestle in one's hands, poking their heads out between one's fingers prettily. To some chicks (Group A) I threw cinnabar caterpillars. They were seized but at once dropped, with some wiping of the bill. The caterpillars were uninjured, and were seldom touched again. They were removed and thrown in again towards the close of the day. Some chicks tried them once, but they were soon left. I could induce birds to pick them up by "pecking" with a pencil, but they were at once dropped.

Ducklings.—There was nothing special to note.

FOURTH DAY.—Chicks.—I threw to the chicks of group A some looper caterpillars and some green caterpillars from gooseberry bushes. They were approached with some suspicion. Presently one chick seized one and ran off, giving rise to a stern chase. Another stole it from the first and ate it. In a few minutes all the caterpillars were cleared off. Later in the day I gave them more of these edible caterpillars, which were eaten freely. Then some cinnabars. One chick ran, but checked itself, and without touching the cinnabar wiped its bill (association). Another seized one

and dropped it at once. A third subsequently approached a cinnabar as it walked along, gave the danger note, and ran off. Then I threw in more edible caterpillars, which again were eaten freely. The chicks thus discriminate by sight between the nice and the nasty caterpillars. To a second group (B) I threw cinnabars and small worms. Both were seized at first with equal appetite, but discrimination was soon established. The chicks began to scratch the ground (perhaps also the day before, but not markedly). Several of them pecked at the burning end of a cigarette two or three times, but some were stopped by a whiff of the smoke, and then shook their heads and wiped their bills. Subsequently, when the cigarette was out and cold, they came and looked at it; and one, after eyeing it, wiped its bill on the ground. A large *Carabus* beetle, sprawling on its back, was an object of fear; one chick at last pecked at it, uttering the danger note, and threw it on one side. After this none went near it.

Ducklings.—Experiments with cinnabar caterpillars, loopers, and worms gave similar results to those obtained with the chicks.

FIFTH DAY.—Chicks.—One of the birds, bolder than the rest, would eat large flies with relish. I threw in a bee. Most of the chicks were afraid, as they were of large flies. The bolder chick, however, snapped it up and ran off with it. Then he dropped it and shook his head, wiping his bill. Probably he tasted the poison and was not stung; in any case, he was quite lively and unconcerned in a few minutes; but he did not touch the bee again. The chicks preened their down early on this day. If they had done so before, I failed to note the fact. Later in the day I put beneath a tumbler a large fly and a small humble-bee with a sting. Two of the chicks ran round the tumbler pecking at the insects. I let the bee escape. The bolder chick seized it, dashed it against the ground, and swallowed it without a wink. With another group of chicks I first gave bees, which were seized but soon let alone, and then *Eristalis*. They were left untouched. Their resemblance to the bees was protective. Later I gave *Eristalis* again, and induced one of the chicks to seize it by pecking at it with my pencil. He ran off with it, chased by others. It was taken from him and swallowed. The other *Eristalis* insects were left untouched, but one was subsequently eaten.

Ducklings.—I placed some frog tadpoles in their water. They were soon spied and eaten greedily. The vulgarity of the duckling as a feeder is painful to witness.

SIXTH DAY.—Chicks.—I gave them their tin without water. They stood in it and pecked, one lifting its head. They scratched at the bottom vigorously, and pecked again and again. On this day they frequently stood up, stretching out their necks and fluttering their wings. They may, however, have begun to do this earlier. Several of them pecked at a sleepy wasp, but soon let it alone. I made a number of experiments on this and the previous day with regard to their ability to catch flies on the wing, placing the insects under a tumbler. The birds pecked at them as seen through the glass. I then let them, one by one, escape. The chicks made a dash at them, but never succeeded in catching one, though they caught one or two as they crawled out before they had taken flight. I tried also with tumblers covered with cards. I may add that up to thirteen days I have never yet once seen a fly captured on the wing by either a chick or duckling, though I have often seen them struck at.

Ducklings.—Each morning, at nine o'clock, I had placed in their pen a large black tray, and on it a flat tin containing water. To this they eagerly ran, drinking and washing in it. On the sixth morning I gave them the tray and tin in the usual way, but without any water. They ran to it, scooped at the bottom, and made all the motions of the beak as if drinking. They squatted in it, dipping their heads and wagging their tails as usual. For some ten minutes they continued to wash in non-existent water (association). I then gave them water. I threw them a bee: one of them

seized it and swallowed it. Possibly he was stung. He kept on scratching his beak—first on one side, then on the other, and seemed uneasy. He was all right again, however, in half an hour, but did not seem keen after a bee I offered him; nor would he take any notice of an *Eristalis*.

SEVENTH DAY.—Chicks (Group A).—I threw in a number of bits of red-brown worsted, one to two inches long. They were seized with eagerness and eaten with avidity. I could not satisfy them with worsted worms, and desisted in the attempt lest the diet should produce unpleasant effects on their little gizzards. I left, however, one four-inch worsted worm, of which the chicks seemed afraid. Presently the bolder one seized it, ran off with it chased by the others, escaped from the pen, reached a secluded corner of my study, and with great efforts swallowed it to the last half-inch. The same chick pecked repeatedly at something near the corner of the turned-up newspaper which then formed the wall of my pen (I now use wire netting). This I found to be the number of the page. He then transferred his attention to the corner of the paper, which he could just reach. Seizing this he pulled at it, bending it down and thus forming a breach in the wall of my experimental poultry-yard, through which he escaped. I caught him and put him back near the same spot. He went at once to the corner, pulled it down, and escaped. I caught him and put him back on the other side of the pen. Presently he sauntered round to the corner, began pecking again, and escaped. I then pulled it up out of his reach. He pecked at it, but soon desisted. This is a good, simple example of the intelligent utilisation of a chance experience. Group A, including this chick, were near the close of their seventh day returned to the yard from which the eggs were obtained through the kindness of my friend, Mr. John Budgett. They were adopted by a broody hen, and were reported to seem afraid of her.

Very noticeable at this stage is the effect of any sudden noise—a sneeze, clapping one's hands, a sharp chord on the violin; or of suddenly pitching among the chicks a piece of screwed-up paper. They scatter and crouch, or sometimes simply crouch down where they are. The constant piping cheep-cheep ceases, and for a moment there is dead stillness, each bird silent and motionless. In a minute or so, up they get and resume their cheeping notes.

Ducklings.—I repeated the experiment with the dry tin. Again they ran to it, shovelling along the bottom with their beaks and squatting down in it. But they sooner gave up the attempt to find satisfaction in a dry bath.

EIGHTH DAY.—Chicks.—On this day I noticed for the first time the chicks crouching down and making all the movements of sand-washing or dusting themselves in the way many birds affect. There was only a little sand strewn over the newspaper and not much good game of the operation. I tried these too (Group B) with worsted worms. They seemed to give complete satisfaction, and there was many a stern chase after the fortunate possessor of an inch of worsted. I tried them again with cinnabar caterpillars, of which they took scarcely any notice. None were seized. I threw in a lump of sugar. The chicks stood round it, uttering the danger note. Then some ran at it, pecking rapidly and withdrawing in haste. They deal thus with moderate-sized suspicious-looking objects.

Ducklings.—On repeating again the experiment with the empty tin they soon left it, and did not squat down in it at all. But when I poured in water they ran to it at once.

TENTH DAY.—Chicks.—I took two of the chicks to the yard from which the eggs were obtained, and opened the basket, in which I had carried them, about two yards from a hen which was clucking to her brood. They took no notice whatever of the sound. They were not in a frightened condition, for they jumped on my hand and ate grain off it, scratching at my fingers. I put them with a hen in a small fowl-house. They did not seem frightened, or, if at all, but little. To those that remained I took back a large hum-

ble-bee. One darted at it, giving it a sharp peck, and throwing it disabled to one side.

Ducklings.—One of the ducklings seized the disabled bee, and, after mumbling it for some time in the water, swallowed it.

THIRTEENTH DAY.—I took the remaining chicks to the yard. A hen in a fowl-house was clucking eagerly to her young brood. The chicks were put down outside, out of sight of her. They took no notice whatever of the clucking sounds she made, but scratched about around me. They were then placed among her brood. She seemed inclined at first to drive them away, but afterwards looked more kindly on them. But they did not keep close to her like her own brood. I went over to see them next day. One was at some little distance from the hen. I leant down and held out my hand. The little thing ran to me and nestled in my palm.

The sounds emitted by the chicks are decidedly instinctive, and some of them are fairly differentiated. At least six may be distinguished. First the gentle piping, expressive of contentment. It is heard when one takes the little bird in one's hand. A further low note, a sort of double sound, seems to be associated with extreme pleasure, as when one strokes the chick's back and cuddles it. Very characteristic and distinct is the danger note—a sound difficult to describe,—perhaps somewhat as if a miniature policeman's rattle were sprung inside the chick's head. This is heard on the second or third day. If a large humble-bee or a black-beetle or a big worm or lump of sugar, or in fact anything largish and strange be thrown to the chicks, the danger note is at once heard. Then there is the cheeping, piping sound, expressive, apparently, of wanting something. It generally ceases when one goes to them and throws some grain or even stands near them. My chicks were accustomed to my presence in the room, and generally were restless when I left them and made this sound. Then there is the sharp squeak when one seizes them against their inclination. Lastly, there is the shrill cry of distress when, for example, one of them is separated from the rest. I have very little doubt that all of these sounds have, or soon acquire, a suggestive value of emotional import for the other chicks. Certainly the danger note at once places others on the alert. But the suggestive value seems to be the result of association and the product of experience.

The foregoing observations I have presented much in the form, though with many omissions, in which they were noted down at the time; hence much crudity of expression. They appear to me to suggest—

- 1) That there are many truly inherited activities performed with considerable but not perfect exactitude in virtue of an innate automatism of structure.
- 2) That associations are formed rapidly and have a considerable amount of permanence.
- 3) That intelligent utilisation of experience is founded on the associations so formed; such associations being a matter of individual acquisition, and not of inheritance.
- 4) That there is no evidence of instinctive knowledge, even in a loose acceptance of this word. This follows from the non-inheritance of associations of impressions and ideas. *Co-ordination of activities* is thus apparently inherited, but *not correlation of impressions and ideas*.
- 5) That even the inherited co-ordinations are perfected and rendered more effective by intelligent guidance.
- 6) That imitation is an important factor in the early stages of mental development.
- 7) That the inherited activities on their first performance are not guided by consciousness, though they are probably accompanied by consciousness. The *role* of consciousness is that of control and guidance. Only on the first performance of an inherited activity is the chick a conscious automaton. In so far as the activity is subsequently modified and perfected by intelligence the agent exercises conscious control. If we then term it an automaton, we

must admit that the automaton has a power of control over its actions in accordance with the conscious concomitants of certain cerebral changes. Into the physiological mechanism of control, as I conceive it, I cannot enter here.

CURRENT TOPICS.

THE doctrine of protection to American industry has invaded the domain of theological economy, and threatens the canonisation monopoly that for a long time has been enjoyed by Italy. Not long ago, a South Carolina gentleman by the name of Collins presented a new church to the colored Episcopalians of his town, and according to Episcopalian custom they proceeded to give it the name of a saint, but after considering the claims of all the saints in the calendar the congregation finally rejected them all. With pious gratitude they dedicated their house of worship to their American benefactor and called it Saint Collins's Church, a name by which it will be known henceforth and forever. The patriotic sentiment that goes by the name of "America for the Americans" applies to saints as well as to other foreigners, and the colored men of South Carolina have given it actual form. Heretofore we have imported all our saints from foreign countries, instead of encouraging the development of native saints among ourselves, but hereafter we shall have our own muster-roll of the beatified, and we shall fill it with American examples. In making a saint of Mr. Collins, the recipients of his bounty have not canonised a myth nor an abstract ideality, but an actual breathing man whose claims to sainthood are based on living deeds, that visible and practical test by which all saints must ultimately stand or fall. They have a saint in England by the name of Lubbock, a member of Parliament, who made one day in every summer-time a holiday which in the calendar of labor is called Saint Lubbock's day. The new religion will have new saints, like Saint Lubbock and Saint Collins, and the present sainthood will pass into the shades of antiquity with Saint Hercules, Saint Ceres, and Saint Mercury.

* * *

In one of the early numbers of *Punch* I have seen a picture of an organ-grinder who stands in front of a London mansion unwinding torment from his dismal box wherein the discords play. A servant comes down the steps and says: "My good man, here's a sixpence for you; there's a sick lady in the house, and master says, will you be kind enough to move on." To this the wandering minstrel answers: "When there's sickness in the house I never move on for less than a shilling." This beautiful principle appears to animate the different "armies" that are marching from various parts of the country to reinforce Coxe in his raid on Washington. They never move on for less than plenty to eat and their travelling expenses. These they readily obtain because every community is happy to welcome them to the next town, and will cheerfully bribe them to go. This liberal and philanthropic spirit is finely developed in San Francisco, as will appear from the following dispatches from that city, dated April 16: "The authorities are arranging to send five hundred unemployed to Chicago via Mojave, for \$2,000. Three hundred members from the second regiment of the industrial army of California marched to the City Hall this morning and applied for assistance. Mayor Ellert and Chief of Police Crowley called upon the Southern Pacific officials, and the railroad company is expected to take the men as far as Mojave, where they can be turned over to the Atlantic and Pacific." Such disinterested magnanimity will be appreciated by the citizens of Chicago. This town is trying to outnumber the population of New York before the time for taking the next census, and this contribution from San Francisco will be gratefully received. If the people of that remote village have any more "industrial regiments" that they are anxious to get rid of at six dollars and sixty-six cents a head, Chicago will gladly take them at that price.

Like a stiletto drawn suddenly from under a cloak, the speech of Senator Hill flashed upon the eyes of the Democratic party, and the stroke that followed made a painful wound; so sore, indeed, as to leave a suspicion that the barb was poisoned. From the organs of his party, acrimonious retorts fell in showers upon Hill, and broke like putty-balls fired at an iron-clad. The stock flatteries, the "Judas Iscariot" and the "Benedict Arnold" comparisons were soon exhausted, and then the angry editors fell back upon their own resources and invented such original compliments as they could: "Out upon him," says the melodramatic *World-Herald* of Omaha, "Out upon him. He is not a Democrat"; and it says that as confidently as if there were any people in Omaha or in any other country who know what a Democrat is. With dignified contempt the *Jacksonville Citizen* describes the oration of Senator Hill as "vaporizing rant," and in a tone of high tragedy the *St. Louis Post-Dispatch* proclaims that Senator Hill is "bloodless as a turnip and heartless as a clam." Having sacrificed the principle of the Wilson Bill for the vote of Senator Hill, the *Louisville Courier-Journal* complains that the Democratic party has been cheated in the trade; and that oratorical organ sorrowfully says, "Was not the fundamental principle of free collars and cuffs ruthlessly sacrificed in order to placate the New York Senator? And so we lose collars and cuffs and honor all alike." This is a humiliating punishment, but it ought to fall upon any party so abandoned as to ruthlessly sacrifice "the fundamental principle of free collars and cuffs." The *Toledo Bee* sharpens its nimble sting and hums in the ear of Senator Hill after the style of Elijah Pogram, thus: "Hill is a creature of the money-bags of the East. His is the Democracy of the East, the Democracy that knows no nation but New York; the Democracy that cannot understand the greatness, the incomparable beauty and grandeur of a country lapped by the Atlantic and Pacific, the great lakes and the gulf." And while the Atlantic and Pacific and the great lakes and the gulf are lapping the country, Senator Hill, admiring his mischief, smiles his own sardonic smile.

* * *

Last Wednesday, the national debating society at Washington spent a pleasant afternoon in proving to the satisfaction of the country that the "two great parties," although differing here and there in theoretical politics, practise the art of statesmanship in precisely the same way. The managers of the two rival corporations exhibited the inside wheels and pulleys of the two "machines" by which their party-work is done; also, they showed in a very interesting way that both of them are built on the same pattern, and that the only way to tell them apart is by the label or trademark tacked on each machine. Mr. Quigg, a Republican member from New York, moralising like a preacher, exposed the political wickedness of appointing Mr. Van Alen ambassador to Italy in return for \$50,000 contributed by Mr. Van Alen to the Democratic election fund; whereupon Mr. Meredith, a Democratic member from Virginia, promptly "saw" Mr. Quigg, and "raised" him \$350,000, by referring to the story that Mr. Wanamaker had contributed \$400,000 to the Republican election fund in 1888, for which benevolence he had been appointed Postmaster General. The comedy of it lies in the impudent affectation by either party of moral superiority over the other, when it is notorious that both of them have raised corruption funds by selling the offices of the government; and the practice will continue so long as party loyalty excuses what public morality condemns. Should a vote of reprobation be called for, we know without counting the ballots what the division would be; the Democrats would censure Wanamaker, and the Republicans would condemn Van Alen, like the partisan man-worshippers who declared that Mr. Beecher was innocent, although they thought the testimony against Mrs. Tilton was very strong.

The schoolboy nonsense known as "filibustering" has met with a check in Congress by the adoption of the tyrannical plan of counting a member as actually present in spite of his own declaration that by a psychological fiction he is absent in the East Indies, in Kamschatka, in China, or perhaps in Kalamazoo. The sport called "breaking a quorum" consists in this, that if you are a member, you have besides your pay the fun of being present and absent at the same time. Your body may be in your usual seat visible to the Speaker and "palpable to feeling as to sight," while your Mahatma, or the voting spirit is out on the raging sea. The rule of stultification declared that the only way to learn whether a member was present or absent was by asking him, and if he said yes by answering at roll-call, he was to be considered present, and it was the duty of the Speaker, like the captain of a ship, to "make it so"; but if the member made no answer, and stood mute, his very silence was conclusive proof that his Mahatma had fled from the Capitol, and he was reported absent. It was rather stupid and expensive too, but that's the way they "broke a quorum" and the heart of the majority. When Mr. Reed was in the speaker's chair four years ago, he actually counted as present all the members he saw present in the body whether their Mahatmas were there or not, and his very sensible plan was called arbitrary, tyrannical, despotic, un-American, even "Rooshan," and Mr. Reed was called the "Czar." He was put in the national pillory, and every stump-orator of the opposite party pelted him from the beginning to the end of the campaigns. Grim triumph made the face of Mr. Reed shine like a full moon the other day when he saw his critics with funeral solemnity adopting the methods of the "Czar," and actually claiming a Democratic patent on the scheme. It was wonderful to see the nerve of Mr. Wise, who had the daring to show from the records that Mr. Reed was not entitled to credit for counting members to make a quorum, that the "Czar" principle was first advocated in 1880 by Mr. J. Randolph Tucker, a Democrat from Virginia, and that it was then vigorously opposed by Mr. Reed. Mr. Wise was historically correct, but in 1880 Mr. Reed was in the minority, and it was then his business to denounce the majority for its encroachments upon the liberty of members to be in two places at once, or present and absent at the same time.

* * *

The wedding at Coburg was a brilliant spectacle, and merely to read the dazzling account of it in the papers makes the eyes blink as they do when we try to stare out of countenance the noonday sun. Imperial diadems and royal robes, epaulettes, and plumes, diamonds, and pearls, poems in embroidery and lace, gave majesty and splendor to the ceremonial, while the rulers of half the world were there to sanction the festival and emblazon it with royalty. The German Emperor was there, with his mother the Empress, and his grandmother the Queen of England. The heir to the Russian throne was there, and princes and dukes more numerous than they are in a fairy tale. I have seen the valley of diamonds at the play, and I think the chapel at Coburg must have been something like that. A ticket to the Coburg wedding would have been almost a title of nobility in itself, but such luxuries are not for me. Many a time I have wondered how it feels to be a king, or a prince, or a grand duke, and the next time I meet one of those glittering demigods I will ask him. We have hundreds of them in Chicago so that I shall have no trouble in getting correct information, but I imagine that the feeling of superiority and exaltation must be delightful as the dreams that opium gives. There are more princes at Chicago now than at Coburg; and among them are three or four whom I have the happiness to number among my personal friends.

* * *

It will appear as a strange historical coincidence that at the very time those imperial and royal potentates were gathered at the

marriage feast in Coburg, a company of equal style and dignity was assembled in Chicago; not at a wedding, indeed, but at the Masonic Temple, giving royalty and splendor to the "Thirty-ninth Annual Reunion of the Ancient Scottish Rite." The stately titles of the visitors who attended the respective celebrations were singularly alike both in sense and sound, but whatever pre-eminence was visible in this respect, Chicago had it. According to the papers it appears that while the wedding was going on at Coburg, "Chicago Council of the Princes of Jerusalem was in session at the temple; not at the temple in Jerusalem but at the temple in Chicago, under the direction and command of Chester T. Deake, sovereign prince of Jerusalem, and James F. Church, High Priest, and thrice potent G. M." I do not understand the cabalistic signs, but I think G. M. are the proper hieroglyphics that stand for Grand Mogul. All the Chicago princes are not of equal rank, for they are classified into three grades, sovereign, illustrious, and sublime. With reverential awe we read that "Gourgas Chapter assembled at five o'clock, with Illustrious Prince John A. May presiding, while Illustrious Prince James B. McFatrlick occupied the throne of the Grand Pontiff," wearing, I suppose, the triple crown upon his head. George W. Warville, "Sublime Prince of the royal secret," wearing the shining jewel of his rank, bestowed some high degrees upon aspiring princelings; and after conferring upon the sublime, illustrious, and sovereign brethren the knighthood of the white and black eagle the conference adjourned. An old army comrade of mine is a batter in Chicago; a knight of the black eagle, and a sovereign prince of Jerusalem; but yet, when you go into his place to buy a hat, he is as affable and condescending as any common man.

M. M. TRUMBULL.

NOTES.

The Open Court Publishing Co. is now publishing a new, authorised translation by Merwin-Marie Snell of the eighth edition of M. Ribot's famous monograph on "The Diseases of the Will," the conclusions of which are contained in M. Ribot's article on "The Will" in this number. The Open Court Publishing Co. has also published "The Diseases of Personality" and "The Psychology of Attention." No better introductions to the science of psychology can be found than these little books of the great French psychologist, all of which are to the point, and not overladen with special discussions. In Mr. Snell's elegant and graceful translation of "The Diseases of the Will" the reader will have a perfect equivalent of the original, enhanced by the fact that all the citations and authorities of the original, many of which were faulty, have been recompared and revised.

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