must have observed that while for a time they but hold up their heads and open their mouths to be fed, they by-and-by begin quite spontaneously to snap at the food. Here the development may be observed as it proceeds. In the case of the swallow I am inclined to think that they catch insects in the air perfectly well immediately on leaving the nest.

With regard, now, to man, is there any reason to suppose that, unlike all other creatures, his mental constitution has to be in the case of each individual built up from the foundation out of the primitive elements of consciousness? Reason seems to me to be all the other way. The infant is helpless at birth for the same reason that the kitten or swallow is helpless—because of its physical immaturity; and I know of nothing to justify the contrary opinion, as held by some of our distinguished psychologists. Why believe that the sparrow can pick up crumbs by instinct, but that man must learn to interpret his visual sensations and to chew his food? Dr. Carpenter, in his "Mental Physiology," has attempted to answer this argument in the only way in which it could be answered. He has produced facts which appear to him to prove "that the acquirement of the power of visually guiding the muscular movements is experimental in the case of the human infant." More than forty years ago Dr. Carpenter took part in an operation performed on a boy three years old for congenital cataract. The operation was successful. In a few days both pupils were almost clear; but though the boy "clearly recognised the *direction* of a candle or other bright object, he was unable as an infant to apprehend its *distance;* so that when told to lay hold of a watch he groped at it just as a young child lying in its cradle." He gradually began to use his eyes; first in places with which he was not familiar, but it was several months before he trusted to them for guidance as other children of his age would do. No one will doubt the accuracy of any of these statements; but I cannot agree with Dr. Carpenter that he had in the case of the boy anything "exactly parallel" to my experiment of hooding chickens at birth and giving them their sight at the end of one or two days. This boy was couched when three years old. Probably sight would have been at first rather puzzling to my chickens, had they not received it until they were six months old. Dr. Carpenter seems to have forgotten for the moment that instincts as well as acquisitions decay through desuetude, and that this is especially true when the faculties in question have never once been started into action and are of the kind which develop through exercise. Another and vital difference between Dr. Carpenter's experiment and mine is this, that when at the end of two days I gave my chickens sight, I did not do so by poking out or lacerating the crystalline lenses of their eyes with a needle.

The presumption, then, that the progress of the infant is but the unfolding of inherited powers remains as strong as ever. With wings there comes to the bird the power to use them; and why should we believe that because the human infant is born without teeth, it should, when they do make their appearance, have to discover their use by a series of happy accidents?

One word as to the origin of instincts. In common with other evolutionists, I have argued that instinct in the present generation may be regarded as the product of the accumulated experiences of past generations. More peculiar to myself, and giving a special meaning to the word experience, is the view that the question of the origin of the most mysterious instincts is not more difficult than, or different from, but is the same with the problem of the origin of the physical structure of the creatures. For, however they may have come by their bodily organisation, it, in my opinion, carries with it a corresponding mental nature.

In opposition to this view it has been urged that we have only to consider almost any well-marked instinct to see that it could never have been a product of evolution. We, it is said most frequently, cannot conceive the experiences that might by inheritance have become the instincts; and we *can* see very clearly that many instincts are so essential to the preservation of the creatures that without them they could never have lived to acquire them. The answer is easy. Granting our utter inability to go back in imagination through the infinite multitude of forms, with their diversified mental characteristics, that stand between the greyhound and the speck of living jelly to which, according to the theory of evolution, it is related by an unbroken line of descent. Granting that we are, if possible, still less able to picture in imagination the process of change from any one form to another. What then? Not surely that the theory of evolution is false! For the same argument will prove that no man present can possibly be the son of his father. Our ignorance is very great, but it is not a very great argument.

The other objection, that the creatures could never have lived to acquire their more important instincts, rests on a careless misunderstanding of the theory of evolution. It assumes in the drollest possible way that evolutionists must believe that in the course of the evolution of the existing races there must have from time to time appeared whole generations of creatures that could not start on life from the want of instincts that they had not got. There can be no need to say more than that these unfortunate creatures are assumed to have been singularly unlike their parents. The answer is, that it is not the doctrine of evolution that the bodies are evolved first by one set of causes and the minds are put in afterwards by another. This notion is but the still lingering shadow of the individual-experience psychology. As evolutionists, whether we take the more common view and regard the actions of animals as prompted by their feelings and guided by their thoughts, or believe, as I do, that animals and men are conscious automata, in either case we are under no necessity of assuming in explanation of the origin of the most mysterious instincts anything beyond the operation of those laws that we see operating around us, but concerning which we have yet to learn more, perhaps, than we have learned.

D. A. SPALDING

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, Sept. 20.—*Résumé* of the observations of the sun and of the planets Mercury, Venus, Mars, Jupiter, Saturn, and Uranus, made at the Paris Observatory during the year 1874, by M. Leverrier.—On a remarkable anatomical peculiarity of the rhinoceros, by MM. Paul and Henri Gervais.—Addition to the note relating to M. Bienaymé's theorem, by M. J. Bertrand.—Chemical and spectroscopic characters of a new metal, Gallium, discovered in a blende from the Pierrefitte mine, Argeles Valley, Pyrenees, by M. Lecoq de Boisbaudran. An account of this metal has already appeared in our columns.—Theorem on the composition of co-variants, by M. C. Jordan.—Preliminary note on the function of the protective sheath in herbaceous Dicotyledons, by M. J. Vesque.—On a vertical column of vapour observed from a balloon, by M. W. de Fonvielle.—On the development and structure of interior foliaceous glands, by M. Joannes Chatin.—Existence and development of the *Avicula contorta* zone in the Isle of Corsica, by MM. L. Dieulafait and Hollande.—On the theory of hail, by M. E. Renou.—On hailstones picked up at Criel-sur-Mer during the storm of August 12, 1875, by M. A. Landrin.

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ERRATUM.—P. 301, line 24, for "blackened temperature" read "maximum temperature."