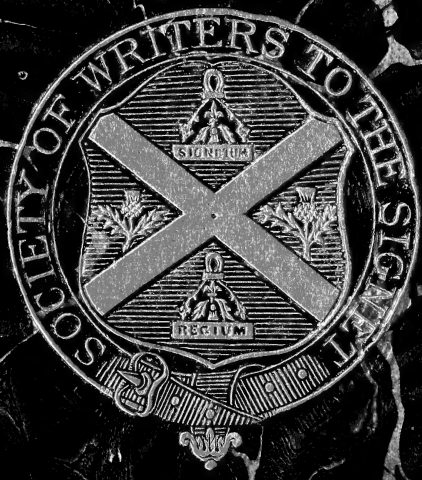
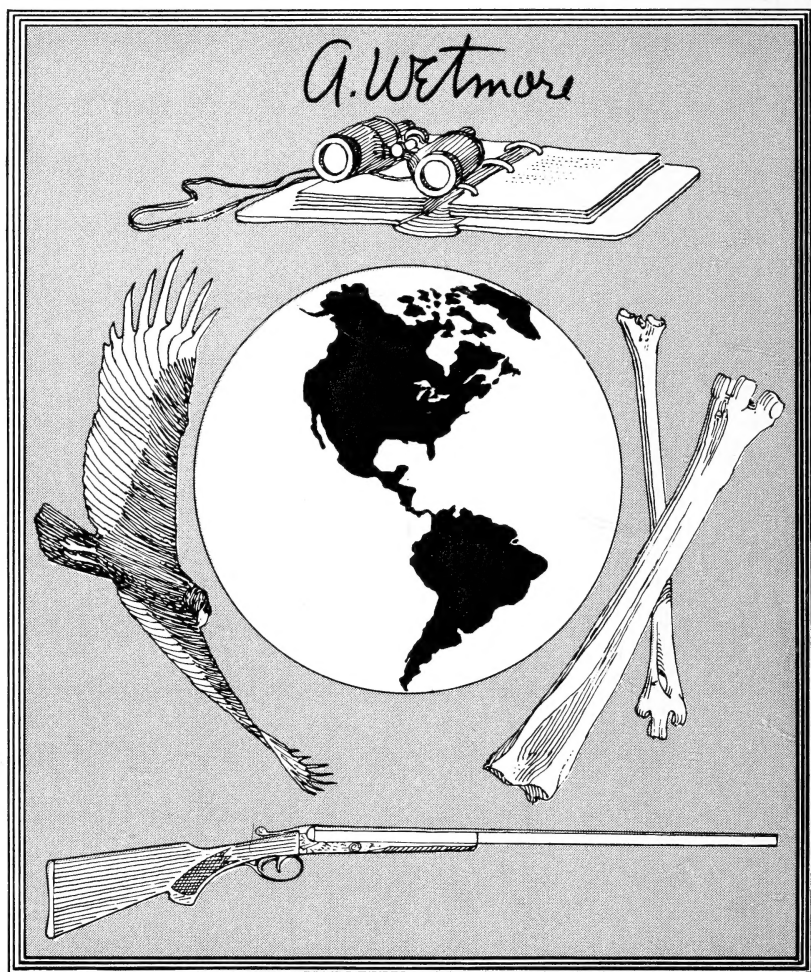


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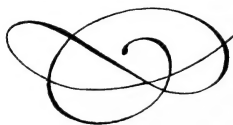
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ON

THE MENTAL QUALITIES OF
BIRDS,

AS COMPARED

WITH THEIR CEREBRAL DEVELOPMENT.

BY

JOHN MACGILLIVRAY,

VICE-PRESIDENT OF THE CUVIERIAN SOCIETY.

“ There is not, in my opinion, anything more mysterious in nature than this instinct in animals, which thus rises above reason, and falls infinitely short of it. It cannot be accounted for by any properties in matter, and at the same time works after so odd a manner, that one cannot think it the faculty of an intellectual being. For my own part, I look upon it as upon the principle of gravitation in bodies, which is not to be explained by any known qualities inherent in the bodies themselves, nor from any laws of mechanism; but according to the best notions of the greatest philosophers, is an immediate impression from the first Mover, and the divine energy acting in the creatures.”—ADDISON. *Spectator*, No. 120.

THE MENTAL QUALITIES OF BIRDS.

ALL animals, with the exception of man, were formerly supposed to act from a natural blind impulse, to which was given the name of instinct, although many admitted the operation of both instinct and reason in the lower animals. The term instinct, however, was used in a very vague manner; for under this head were included not only all the feelings and propensities, but even their various executive powers. In this manner attempts have been made to explain the habits and mental attributes of the lower animals, but without success, from the want of sound data. From this state of confusion, during which no two writers agreed in assigning even the proximate cause to any mental act, Phrenology proposed to deliver us, and by pointing out "the constancy of particular forms of the brain with certain affective and intellectual faculties," to afford a satisfactory clue to the explanation of the whole mystery.

ON
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&c.

ALL animals, with the exception of man, were formerly supposed to act from a natural blind impulse, to which was given the name of INSTINCT, although many admitted the operation of both instinct and reason in the lower animals. The term instinct, however, was used in a very vague manner; for under this head were included not only all their feelings and propensities, but even their various perceptive powers. In this manner attempts have been made to explain the habits and mental attributes of the lower animals, but without success, from the want of sound *data*. From this state of confusion, during which no two writers agreed in assigning even the proximate cause to any mental act, Phrenology proposed to deliver us, and by pointing out "the constancy of particular forms of the brain with certain affective and intellectual faculties," to afford a satisfactory clue to the explanation of the whole mystery.

“The chief peculiarity,” observes Dr. Pritchard, “of Dr. Gall’s psychological theory, was the attempt to draw a parallel between the animal qualities displayed by the lower animals, and the individual varieties discovered among men.”* It is proposed, in the present paper, to examine the grounds on which this theory rests, and to investigate the relation supposed by phrenologists to exist between the cerebral configuration of animals, and their various instincts or mental powers, for such Gall considers them to be.

Although it is probable that metaphysicians have erred in considering reason and instinct as widely different from each other, and in having separated them by so broad a boundary as they imagine to be indicated in nature, yet none of their number have ever considered the operations of the brute mind in a manner, which, to appearance at least, promised to lead to such astonishing results as we are informed have been drawn by the aid of phrenology, from fields so often, though unsuccessfully explored. We are told by a late writer on this subject, that by investigating nature by the aid of phrenology, “we will have accurate and sound physiological *data*, and a definite vocabulary; and we will not then be obliged to use the ambiguous term *instinct*, to designate in animals all their feelings and propensities, as well as their various perceptive powers.”† In the present state of our knowledge of mental operations, it is our duty carefully to examine the grounds on which each new system is founded, in the hopes that by so doing, some new light will be thrown

* Pritchard on Insanity, p. 465.

† The Naturalist, vol. iv. p. 428.

upon the dark and uninviting shadows of metaphysical research; and when applied to a subject, which the investigations of some, and the hypotheses and theories of others, have rendered so fraught with interest both to the metaphysician, the physiologist, and the naturalist, this observation will be found to hold good. As phrenology is professedly a science of pure induction, and is stated by its advocates to rest on facts, "to deny the truth of which," according to one of their body, "is to put in doubt the existence of the best established phenomena,"* it behoves us to examine the facts for ourselves, and our task thus promises to be easy, and our conclusions highly satisfactory.

Although the writings of Gall and Spurzheim abound in passages relating to comparative phrenology, all, as they imagine, illustrating the general principles of the science, and confirming the seats of the different faculties in several species of the lower animals, yet how little dependence is placed upon their assertions, even by phrenologists themselves, is evident from such passages as the following:— "Spurzheim had so little studied the anatomy of the skull of animals, as to place the organ of Courage, (Combativeness), in the dog, upon the point of insertion of the posterior muscles of the neck."† And in another place he points out the same organ in the horse, exactly upon the bone of the lower jaw, as Gall had done before him. Nor has the founder of phrenology himself been less fortunate in escaping the critical acumen of Vimont, his former pupil, whom we find saying, "If Gall had only studied the anatomy of the skull and brain upon a dozen species, with

* See Combe's Phrenology, p. 885, 4th edit.

† See plate VII. of Spurzheim's Phrenology, 3d edit.

whose manners he was well acquainted, he would not employ language so vague as we constantly find him using, whenever he treats of the application of phrenology to the skulls of animals.* Yet these are the men who say that “ a physiological system of the brain would necessarily be false, were it in contradiction with its anatomical structure ;”† and on anatomy accordingly, conjoined with physiology, do they deem their system secure as on a rock, although of that portion of their labours which alone we are considering, viz. comparative phrenology, no less an authority than Tiedemann says as follows:—“ If we take a glance over the great work of Dr. Gall, we see prevailing everywhere the idea that we must study the structure of the nervous system and the brain, in rising gradually from the most simple animals up to man. But what has Dr. Gall really done? He has only described and represented the nerves of a caterpillar, the brain of a hen, and the spinal marrow of some mammalia ; and yet his work is not free from errors in this point.”‡

Since it has thus been shewn that the statements of Gall and Spurzheim, with respect to comparative phrenology at least, are not to be relied on, it is fortunate indeed for their followers, that one of their number has more than compensated for this original defect. I allude to Dr. Joseph Vimont of Paris, by far the most scientific phrenologist of the day, and the only one who appears to have examined phrenology in all its bearings, upon man as well as on the lower animals. This gentleman, after the undivided labour of

* Vimont's *Traité de Phrenologie*, p. 332.

† *Encyclopædia Britannica*, p. 466.

‡ See Vimont's *Prospectus*, p. 9.

six years, and at considerable expense, completed in 1827 his Memoir on Comparative Phrenology, which he had undertaken in order to compete for the prize offered by the French Institute, ten years before, and the object of which was to obtain information on the organization of the skull and brain in animals. Accompanying this essay was a collection of skulls, to the number of 1200, along with many brains modelled in wax, and an atlas of plates representing the objects referred to.* His observations have since been presented to the public, accompanied with figures, unrivalled as anatomical representations, and in point of execution, far surpassing the illustrations to most scientific works.

Of his labours it is impossible to speak with too much praise; and had he done nothing but merely correct the innumerable errors committed by his predecessors, his name would still rank as one of the founders of phrenology. But he has done more:—besides giving a minute account of the nervous system and form of the cranium, as existing throughout the vertebrata, he has endeavoured to trace all the psychological acts of the lower animals to their very source, and to point out upon the brain the different organs which control *all* their actions. As he considered, and with justice, that all other writers on phrenology had taken too limited a view of their subject, and, in a manner, considered man alone, he brings in to his aid a host of observations made upon the lower animals, and throwing this reflected light of analogy upon previously ascertained facts, is thus enabled to confirm the conclusions he had formerly arrived

* Phrenological Journal, vol. iv. p. 150.

at, or, if there be any discrepancies, to consider them anew. It is to Vimont, then, that we are indebted for almost all that has been done in comparative phrenology; for it does not appear, that in his own, or in any other country, has this interesting branch of natural history been so successfully investigated; nor am I aware that any of his (original) statements have been called in question, although this is probably from the fact of naturalists not being sufficiently aware of their importance.

After this slight introductory and historical sketch, it will be proper, before proceeding farther, to point out the chief characteristics of the brain in birds.

On inspecting the brain of a bird, it may be perceived at first sight, to be composed of six principal parts; two hemispheres, two optic thalami, a cerebellum, and a medulla oblongata. The cerebrum is remarkable, on account of the absence of convolutions on its surface; and this circumstance, together with the extraordinary development of the optic lobes, is sufficient to distinguish it at first sight from that of a mammiferous animal. The cerebellum is composed of a single lobe, corresponding to the middle lobe in man and the other mammalia. The two bodies called the optic lobes, or thalami, are generally considered as analogous to the corpora quadrigemina of animals higher in the scale.

The absence of convolutions on the brain naturally appears a startling objection to the doctrines of the phrenologists, since their science teaches us, that the different mental faculties, feelings, and propensities, reside in different convolutions of the brain, which Vimont professes to point out in man and quadrupeds. The convolutions, it is true,

are only the external limits of the cerebral *organs*, each of which is imagined by phrenologists to extend from the surface to the very base of the brain ; yet we are told repeatedly, that the cause of the vast intellectual superiority enjoyed by man over the lower animals, is the large size and prominence of the convolutions on his brain, conjoined with the great relative magnitude of his encephalon. "Perfection of function," says Mr. Lawrence, "is seen in connexion with full development of nervous matter ; deficiency, with imperfect organization, and absolute negation of function, with a corresponding chasm in the structure of the nervous system ; and this is true, not only of the four great divisions of the animal kingdom, but is equally so in each department."*

In accordance with the statements of phrenologists, we would expect, in descending from quadrupeds to birds, to find the mental faculties of the latter class developed in an infinitely less degree than in the mammalia. But this is not the case ; for although we find the docility of the dog and the elephant unrivalled among birds, yet, taken in mass, we do not find the diversity in the comparative sagacity of the two classes of animals at all proportionate to the wide difference in the development of the cerebral mass. To prove that such is not a mere supposition, let us instance the docility of the falcon, the raven, the carrier-pigeon, and the parrot, all of which, in complication of cerebral structure, fall far short of the most simple brain we find among the mammalia. Is a squirrel more sagacious than a sparrow ? or does a cat shew more cunning than a magpie ? Is

* See Phrenological Journal, vol. iv. p. 481.

the migratory instinct of the swallow less wonderful than that of the lemming or the rein-deer? It is familiar to all, that the lapwing, the plover, and many other birds, will feign lameness in order to draw away an intruder from the neighbourhood of their nests; and the conduct of the hooded crow, in obtaining food from the larger shell-fish, by dropping them upon the ground from a great height, appears to be perfectly rational. Indeed every ornithological work abounds with passages relating occurrences of a similar nature; but the above illustrations are sufficient to shew, that birds are in nowise behind the mammalia (man, and two or three others, being alone excepted) in the extent to which their reasoning powers, or instinct, if this term be preferred, are developed. Yet, by the phrenological doctrine, we ought to regard them *a priori* as almost devoid of mental qualities, on account of the extreme structural simplicity of their brain.

It is necessary, according to phrenologists, before proceeding to compare mental faculties with cerebral development, to be satisfied, “1st, that the mental qualities of individuals can be discovered; and, 2dly, that the size of the brain can be ascertained during life.”*

That these two conditions, originally intended to apply to human phrenology, are equally applicable to that branch of the science which treats of the faculties and cerebral development of the lower animals, phrenologists have endeavoured to prove. The rule, that the *individual* qualities of *each* animal must be known, appears at first sight almost

* Combe's System of Phrenology, vol. i. p. 85.

impracticable, or at least very difficult to fulfil, unless each individual animal to be examined had been brought up in captivity, and thus, being constantly open to observation, its mental qualities had become accurately known. But phrenologists themselves admit, that "it must have struck every observer, that the differences of mental character are met with to a much greater extent, and with much greater frequency, among man, than among the individuals of any species of the lower animals."* The natural dispositions of all birds, in the state of nature at least, are as nearly as possible similar among all the individuals of each species; and even phrenologists themselves tacitly admit the fact when they say, for example, that such and such an organ will be found largely developed in *the* sparrow or *the* crow, thereby esteeming *all* sparrows and *all* crows as of a similar nature. The difference in this respect becomes still more apparent, when we think how ludicrous it would be to talk of wit, philoprogenitiveness, or any other organ, being largely developed in man, that is, in the whole genus *Homo*.

Having thus got over the first condition, we are now prepared to consider the second, or whether the size of the brain can be discovered during life, or rather, as applied to the lower animals, after death; for, while with birds it is within the reach of every one to observe their habits, and after so doing, to kill the animal and examine its brain, a similar proceeding with regard to our own species could be practised only by a few men of science, as the czar of Russia, and the Turkish sultan. As it is inconvenient in all

* Combe's System of Phrenology, vol. i. p. 85.

cases to examine the brain itself, it is obviously of great importance, that the size, configuration, and relative proportion of that organ, can be detected by an inspection of the cranium alone. Phrenologists, accordingly, have laboured to prove that such is the case, with what success we shall presently see.

On making a section of the cranium of a bird, several distinct cavities are seen on its *internal surface*. The largest and most important of these is that for lodging the cerebrum, or brain proper, and is divided in the mesial line by a slight bony elevation, defining the boundaries of each hemisphere. There are, besides, lower down and slightly posterior, two cavities of smaller size, for the reception of the optic lobes; and beneath them is situated a well marked cavity, in which is contained the cerebellum. Besides these principal cavities, of which that for lodging the cerebrum is by far the largest, there are two others of smaller size at the base of the skull, the one for the reception of the medulla oblongata, the other, analogous to the *sella turcica*, in man, for containing the pineal gland. These depressions are more obvious in some classes of birds than in others. Thus, in two sectioned skulls of the hen-harrier, (a bird of prey), lying before me, the boundaries of each of the cavities I have just mentioned are much more distinct than in the skulls of two magpies similarly treated. In the latter, for example, there is scarcely any boundary between the cavity for the cerebrum and those for the optic lobes, far less is there the projecting bony ridge to be seen in the crania of rapacious birds in general.

On the *external surface* of the cranium of birds, we see none of those small elevations and depressions so frequent

in the skulls of man and the mammalia, but, on the contrary, any rising or falling on the surface is gradual, and includes within its boundaries several, nay, even ten, a dozen, or more, phrenological organs, so that it is utterly impossible to point out whether any particular organ is or is not well developed. Thus, in a skull now before me, that of the ivory-billed woodpecker, I am unable to point out a single elevation or depression upon that part of the cranium covering the brain proper; therefore the only phrenological alternative* (the brain being relatively of large size), is, that the propensities and faculties are enjoyed by this bird in the highest degree. We are told, that "size is clearly a concomitant of power in extreme cases;"† that "individuals with a very large brain manifest, clearly and unequivocally, great force of character;"‡ and since, of all crania in my possession, that of the tom-tit (*Parus major*) is proportionately larger than that of any other bird with which I am acquainted, this little creature ought to be "daring, desperate, and energetic," or else possessed of "strength, (of mind), energy, and determination;" as far exceeding the whole feathered tribe in all its faculties, as it does in cerebral organization. A phrenologist, no doubt, would reply to this, that size alone is not sufficient; it only gives *power*, and not *activity*; that there is not the same fineness of texture, and delicacy of fibre, which we find in the human brain, and which is essential before a faculty can be manifested in a high degree through

* "General full development, however great, will present no partial eminences."—Combe's System of Phrenology, p. 214.

† Combe's System of Phrenology, vol. ii. p. 688.

‡ Ibid. p. 687.

its peculiar organ ; to all which it might be answered thus—you state that the brain of birds is not so complicated as that of man, and by your own principles, function *ought* to be in a corresponding ratio ; but take an individual organ, *constructiveness* for instance, and though we have no reason to suppose that this particular organ is of a more delicate texture than any other part of the same brain, yet, may I ask, did you ever see, or can you anywhere find, a man, who, with *constructiveness* ever so well developed, could form out of the same materials used by a little bird, a nest like that of the goldfinch, still less the pensile nests of the grosbeaks and orioles? No! the cleverest artisan, the most profound mechanical genius, would be baffled in the attempt, and thus afford a proof, that in *some* respects the ingenuity of man, sedulously cultivated, and matured by experience, is no match for the workings of an untaught instinct, implanted by Nature in those animals whom we have taught ourselves to regard as our inferiors.

It would be easy to point out many instances where the outside of the cranium does not indicate any prominence or depression upon the brain beneath. I shall adduce only one, to be met with in the skull of the duck, and many other birds. On the superior surface of the brain, there are two elongated, parallel eminences, of great size, strongly marking the internal surface of the cranium, which, however, are not indicated externally. But why adduce instances? An observer, by comparing the brain and skull of any bird whatever, may verify the truth of my statement.

It is evident that phrenologists, in order to support their ill constructed edifice, *must* lay down organs upon the brain

of birds, because they manifest at least as much intelligence as quadrupeds, the structure of whose brain is nearly similar to that of man himself, and consequently its functions, if not identical, at least analogous. Gall and Spurzheim, accordingly, endeavoured to do so, but with what success I have already shewn; and the investigations of Vimont alone are to be held as orthodox, and alone are worthy of serious consideration.

Vimont has assigned seats upon the brain of birds to many of the mental faculties formerly considered as proper to man, and in his atlas figures the skull of a crow, upon which are indicated no less than twenty-eight different organs, analogues of the forty-two into which he has parcelled the human mind. These, he states, have all been determined by his own observation to be the seats of as many different faculties; for we are told, that "phrenologists admit neither fewer, nor a greater number of faculties than they find in nature."*

Let us see how the seats of the faculties are determined by phrenologists. This appears at first sight an easy task. All that seems necessary, is to ascertain the parts of the brain of birds which are analogous to those of the human cerebrum, on which latter the *organs* have been already determined. But many difficulties lie in our way; the absence of convolutions is one, and the principal one. The brain of a bird, as already noticed, appears smooth and uniform in its surface, and no marks are visible by which to divide it into lobes, or even point out any individual part which corresponds to a given point on the brain of the

* Combe's System of Phrenology, p. 779.

mammalia.* What then is to be done? The question naturally follows, is it a brain at all? or, if it be, how are we to parcel it out into different organs? The phrenologists say, "by observation." As a fair specimen of their manner of observing, I shall adduce Vimont's reasons for supposing that the organ of Time occupies a particular part of the brain of a crow which he specifies. The first is, because the function of the part in question has not yet been determined; the second, because certain organs being adjacent, and forming groups, it is natural that the situation of Time should be close to those of Resistance, Order, and Distance; his third reason is, because this region is very prominent in the crow, which is gifted in a remarkable degree with the faculty of appreciating time; and his fourth is, because he has found this organ very prominent in all birds of passage.†

Having thus ascertained the seat of each organ in a given individual, by the aid of such specious reasoning as I have adduced, the next point is to determine it in others. One would think, that the function residing in any given part of the brain of a crow, for example, would likewise be found in the corresponding part of the brain of an eagle, a hen, or indeed any other bird. But this, according to phrenology, is not the proper mode of inquiry, as may be seen by the following quotation: "Because in man, and in the dog, and carnivorous animals in general, Destructiveness is discovered by observation to lie above the *meatus auditorius*, it does not follow that the portion of

* I speak here of the brain proper, apart from its appendages and connexions.

† *Traité de Phrenologie*, p. 376.

brain lying above the meatus in animals of different species, which are not carnivorous, must have the same function.”*

What I would maintain is simply this; that when the seats of the individual faculties have been determined in one species of bird, there ought to be no difficulty in determining them in all other birds which have the same number of cerebral parts. But this, the only rational mode of examination, it is evident, would not suit the advocates of phrenology; for by elucidating the *truth*, and that alone, a theory, which, like theirs, is founded upon particular, and not upon universal facts, falls at once to the ground. It would appear, that, in order to determine the seats of the different faculties, a series of observations must be made on *each* species, or even upon different individuals of that species. How is it, may I ask, that while the situation of Destructiveness is admitted to be exactly the same in all birds without exception, † that of its neighbour, Combative-ness, should be differently situated in the hen from what it is in rapacious and other birds? It requires no great penetration to assign the cause of all this. Combativeness being a prominent propensity in rapacious birds, it is very easy to fix upon some protuberance on their cranium under which to localise it; and if, on comparing the skull of a non-combatant in the same situation, the phrenologist should find, instead of a depression, a *bump* there also, a very little stretch of the imagination is all that is required to transfer the faculty in question to the first remarkable depression in the immediate neighbourhood, and then consider this marvellous induction as complete.

* Phrenological Journal, vol. i. p. 222.

† Vimont's *Traité de Phrenologie*, p. 290.

The utter fallacy of the phrenological doctrines, as applied to the explanation of the psychological acts of animals, is no less apparent than real. Phrenologists maintain, as is well known, that the same profound mechanical genius which enabled Archimedes to destroy the Roman fleet, and which prompted the ancient Egyptians to rear up those massy edifices which will endure to the end of time, is no less called into daily operation by the bee in the construction of its little cell; as if the impelling cause were identical, and this tiny insect had studied the exact sciences, and was guided in its building operations by pure reason; the only conclusion to be drawn if we admit of the phrenological explanation. If we consider instinct as a natural impulse to certain actions, common to all the individuals of a species; which is neither improved nor deteriorated by experience, being perfect from the beginning; and yet deny, as phrenologists profess to do, that it is by this that the bird builds its nest and the bee its cell, a *reductio ad absurdum* is furnished, as complete as could be wished.

Let us now examine in detail a few of the phrenological faculties, as existing in birds; and I cannot do better than devote the remainder of the present paper to this part of our subject, bearing in mind, that there are generally two sides to every question, and clearly so in the present, despite of the ominous silence which phrenologists have hitherto observed towards all that militates against them. I shall commence with Philoprogenitiveness.

With a few exceptions, all birds manifest more or less attachment to their offspring; and according to phrenology, this is to be attributed to the degree in which the organ of

Philoprogenitiveness is developed in each species. The apparently unnatural conduct of the European cuckow, (*Cuculus canorus*), in leaving to another bird the maternal duty of bringing up its own offspring, has not escaped the attention of naturalists. In the writings of Pliny, and even of Aristotle, this circumstance is mentioned as one of the most curious anomalies we meet with in nature; and although the fact has often been doubted, yet modern writers, as Jenner, Montagu, and others, have completely established its truth. Vaillant, during his travels in Southern Africa, met with another species of cuckow, (*C. auratus*), which acts in a similar manner; and Temminck, in his *Manuel d'Ornithologie*, expressly states, that the genuine cuckows, by some means not yet positively ascertained, deposit their eggs in the nests of different species of small birds. We thus find it established by the highest authority, that some species of birds do not seem to possess the *faculty* of philoprogenitiveness; and in order to account for this strange deficiency, Gall has stated, that the *organ* is "extremely defective" in the European cuckow, the only one he had an opportunity of examining. However, as the situation which he assigned to the organ in question, though strictly analogous to its site in man, is deemed by Vimont to be occupied by another organ, we shall consider the faculty as residing in the cerebral portion pointed out by the latter author. It is easy to perceive an evident depression on each side, at the lateral and posterior regions of the cranium; and thus far the habits of the bird and its phrenological development appear to coincide. I say appear only, for if we proceed a step farther in our investigation, a curious fact will be brought to light.

The three species of cuckows which inhabit North America, far from imitating the conduct of their brethren in the Old World, are known each to build its own nest, hatch its own eggs, and rear its own young; while, in conjugal and parental affection, they are said by Wilson to appear nowise behind any of their neighbours of the grove. Nay, so far is this from being the case, that there is an instance mentioned by Audubon, in his Ornithological Biography, of eleven young cuckows having been hatched and reared in one season by a single pair of old birds. Thus we have every reason to believe, that the American cuckows manifest at least as much affection for their young as most other birds do; and by the phrenological doctrine, they ought to have the organ of Philoprogenitiveness, if not of large size, yet fully developed. But such is not the case; for on comparing the skulls of two of the cuckows above mentioned, the *Coccyzus Americanus*, or yellow-billed cuckow, and the *C. erythrophthalmus*, or black-billed cuckow, both of which are in our possession, with the European cuckow (*Cuculus canorus*), the deficiency at the situation of Philoprogenitiveness is seen to be common to all three, and if possible, is most conspicuous in the *C. Americanus*, which rears its own young.

It may be objected to the above, that the three birds compared do not belong to the same genus, to which I would reply as follows: Although by modern ornithologists, with whom a few trifling differences in the integuments are sufficient to characterize genera, the birds in question are divided, yet their generic distinctions are founded merely on a slight difference in the form of the bill, and the shape of the nostrils, while the general con-

figuration of the cranium, and consequently of the whole body, is nearly similar. Besides, Vimont, *when it suits his purpose*, does not hesitate to compare birds widely separated from each other,* although he himself at another time,† insists on the necessity of their belonging to the same family, or even genus, in order to render them legitimate objects of phrenological comparison; and if Vimont follows this double mode of inquiry, why should not also his opponents be entitled to use the same weapons as himself?

That extraordinary impulse, or instinct, which impels certain birds to migrate at definite periods, though at all times the wonder of naturalists and philosophers, as furnishing an ample field of interesting inquiry, still remains as mysterious as ever. How a little bird like the swallow, should come from some unknown region of the “sunny south,” a distance of thousands of miles, and, with undeviating accuracy, return to the land which gave it birth, nay, even the very spot where it was hatched the preceding year, and perform all this migration anew during every succeeding year of its existence, has ever been reckoned one of the mysteries of nature.

Phrenology professes to account for the migration of birds on rational principles; for Dr. Gall traced it to a periodical excitement of the organ of Locality, which he maintains is very large in all migratory birds. Vimont even professes to be able to point out, *a priori*, a migratory from a resident bird, by the configuration of its cranium; and he tells us

* *Traité de Phrenologie*, p. 304, where he compares the skull of a *hen* with that of a *buzzard*, birds as widely separated as possible.

† *Ibid.* p. 261.

that he actually did so, at a meeting of the French Institute, and in the presence of Majendie. Vimont states, that he has discovered, in birds of passage, other two faculties besides Locality, termed by him *distance* and *resistance*,* which, in his estimation, act a prominent part in impelling them towards migration. The first of these, he says, gives a knowledge of the space travelled over; the other, in all probability, enables them to appreciate the direction of the winds. He considers that Gall has not been at the trouble of studying with any degree of care the manners of migratory birds, or he would have attributed more weight to inclemency of the weather as an impelling cause; "for," says he, "the more severe the season is, the greater is the number of individuals of the same species which go southward."

Dr. Vimont states, that the faculty known to phrenologists by the name of Locality is found in all animals, though it differs in degree; and to this diversity are we to attribute the remarkable phenomenon of birds returning with accuracy to the same spot, after an absence of five or six months. At the same time, Vimont considers this as not the sole cause of migration; inclemency of climate, and other causes little known, contribute to effect the same end; and he thinks that another faculty, besides Locality, Distance, and Resistance, namely, that of Time, is also concerned in migration. The last-mentioned organ may be confounded with Philoprogenitiveness; and observers are liable to fall into this error, which, however, is trifling, compared with that committed by Gall, when he laid down

* The organs of these two faculties appear to be analogous to No. 25, or Weight, of the Edinburgh Phrenologists.

in his atlas, upon the skull of a mallard, the organ of Locality, as occupying the whole extent of the frontal bone, the seat of, according to Vimont, at least seven or eight distinct organs.

Vimont next proceeds to apply his doctrines as follows: The frontal bone of birds, says he, may present two very different characters in its anterior and external portion, or that which forms an arch over the orbits; it may either be depressed and flattened, or else present a considerable degree of swelling. The first arrangement is seen in the raven, magpie, cuckow, the swift, and the different species of herons. In ducks, again, wild-geese, and swans, the orbital border is rounded and swelled, as if pushed out from within. In all those species of the above which have the orbital border, we are to look for the organ of Locality further back. It is easy to see, he continues, that this part is sensibly prominent on the skull of the swallow, the swift, the cuckow, and indeed of all *summer* birds of passage. In several *winter* visitants, again, as all the geese and ducks, the orbital border is rounded and arched. This conformation Vimont considers to be owing to the large size of the organ of Geometry, because these birds fly in triangles. This organ is large also in the grebes, curlews, and godwits. None of the summer birds, again, have this arrangement.

Such, then, is the body of facts on which Vimont triumphantly rests his theory of the migration of birds. But a very few words will suffice to expose the fallacy of his mode of inquiry, and to point out the opposite results to which another person may come, who has no favourite hypothesis

to support, and through the medium of which to view nature.

A simple mode of testing its merits is as follows: Take a genus of birds, consisting of species which migrate, and of others which are resident. The thrushes form a genus of this kind, and of upwards of a dozen species in my collection, I shall select the skulls of four, the fieldfare (*Turdus pilaris*), the redwing (*T. iliacus*), the blackbird (*T. Merula*), and the song-thrush (*T. musicus*), the two former of which are migratory, and the two latter resident birds. On comparing the cranium of the blackbird in its anterior and lateral region, the seats of Locality, Distance, Resistance, and Time, with the corresponding situations in the skull of the fieldfare, the region in question will be at once perceived to be sensibly more developed in the former than in the latter bird, the reverse of what phrenologists affirm to be the case. The skull of the song-thrush, in like manner, is decidedly fuller in the same region than that of the redwing. That there is no fallacy in these observations of ours, it is within the reach of every one to satisfy himself; for all the birds mentioned may be easily procured, and their skulls compared with each other.

Nor are similar instances to the above of rare occurrence. On examining the skull of the ring-dove (*Columba Palumbus*) with that of the migratory pigeon (*C. migratoria*), we do not find any difference in the development of the four organs which give the migratory impulse, sufficient to account for the immense difference in the habits of the two birds. The one resides with us the whole year round, while the extraordinary migrations of the latter have been long known to naturalists.

Let us take a third instance of birds nearly allied, which manifest differences in their migratory propensities. The robin (*Erythacus Rubecula*) and the wheatear (*Saxicola Œnanthe*) have skulls as nearly as possible similar to each other. The former, however, as is well known, remains with us during the whole year, while the latter departs in autumn, and returns in spring. Do we find this indicated by the form of the cranium or the shape of the brain, as the phrenologists try to persuade us is the case? Assuredly not. The form of the skull is exactly similar at the situation of the organs in question.

The peregrine falcon (*Falco peregrinus*), as its name denotes, is remarkable for its wandering disposition; though by no means a migratory bird, yet it has been found at sea midway between this country and the New World;* and an individual which escaped from confinement at Fountainbleau, was found next day at Malta, a distance of 1350 miles.† The organ of Locality, then, *ought* to be very large in this species, as one of its attributes is the propensity to wander. But this is very far from being the case; it is even smaller (relatively) than in the kestrel (*F. Tinnunculus*), which is a stationary bird. A migratory species‡ of the same genus, the pigeon hawk of North America, (*F. columbarius*), has a development exactly similar to that of our kestrel, although the difference in habits is immense.

I had occasion shortly to allude to the wandering propensities of the peregrine falcon, but there are other birds which show the same tendency in a still greater degree.

* Audubon's Ornithological Biography, vol. i. p. 88.

† Montagu's Ornithological Dictionary by Rennie, p. 183.

‡ Audubon's Synopsis, p. 16.

Among the skulls now lying before me, are those of the frigate-bird (*Tachypetes Aquilus*), the shearwater (*Rhynchops nigra*), the albatross (*Diomedea exulans*), and the stormy petrel (*Thalassidroma pelagica*). These are all, especially the two latter, remarkable for their disposition to wander. Thus the albatross, a sacred bird to all who would fondly associate it with the tale of "The Ancient Mariner," has been known to follow vessels for days and even weeks, to pick up whatever food may be thrown overboard, though hundreds of miles from any known land, on which to rest it after its weary flight. These all should have the organ of Locality of large size, which is far from being the case; for, on comparing the albatross, for instance, with the cranium of any large gull, which it resembles remarkably, there is no striking difference in the development of that organ, which, phrenologists allege, gives the propensity to wander.

In attempting to answer the query thus beautifully rendered,—

"Who bade the stork, Columbus-like, explore,
Heavens not his own, and worlds unknown before;
Who calls the council, states the certain day,
Who forms the phalanx, and who points the way?"*

the phrenologist has signally failed. Instead of tracing this wonderful instinct to its Maker, in the vain wish to unravel the mysteries of nature, man forgets that there are bounds to human understanding, and that in our present defective state of knowledge, all speculation is useless when applied to a subject lying far beyond the cognizance of our senses, and which will probably for ever remain unknown.

* Pope's Essay on Man.

It is a matter of surprise that phrenologists have not discovered greater differences between birds possessed of the musical faculty, and those devoid of it. Vimont mentions, as the result of his anatomical researches, that the difference of organization between the brain and skull of birds which sing, and those which do not, is not appreciable except in the different individuals of a species, or the members of the same genus.*

After pointing out the absurdities of Gall, in laying down this organ, so that by the test he has given, the different families of ducks, geese, and swans (especially the last),† ought to be largely endowed with musical talent, Vimont localises the organ in question in a spot immediately behind the centre of the posterior orbital border.‡ He gives figures of two species of grosbeak (*Pitylus* and *Coccothraustes*), and the organ of Tune is large in the one which sings, and small in that which is not musical.

The manner in which Vimont hurries over his consideration of this organ, leads one to suspect that he has at length found a faculty and organ at variance with each other, and is apprehensive of exposing the hollow foundations of his system, should he proceed farther.

* *Traité de Phrenologie*, p. 399.

† Perhaps Plato, Aristotle, and Ovid are in the right when they talk of the musical notes of the dying swan; although the less credulous authors of modern times seem as sceptical on this point as Sir T. Brown, who in his "Vulgar Errors" quaintly enough insinuates, "Surely he that is bit by the tarantula, shall never be cured by this kind of musick; in like hopes, we expect to hear of the harmony of the spheres." Or it may be that the swans of our own degenerate days have lost the art of singing possessed by their ancestors of the Cayster, and other classic waters, while nature, when she deprived them of the faculty of tune, has left the *bump* behind.

‡ *Traité de Phrenologie*. p. 399.

These suspicions are verified by an inspection of nature ; for, on comparing the skull of the sparrow (*Fringilla domestica*), with that of the canary (*F. canaria*), it will be perceived that the musical organ is much better developed in the former than in the latter. I have before me specimens of both ; the canary, an old male, was remarkable for its singing talents, while the other, also a male, was as unmusical as sparrows usually are. We must then, if we place any faith in phrenology, immediately elevate the sparrow to the rank of a songster, for although it cannot sing, the large size of Tune giving only *power*, not *activity*, yet no doubt by proper training and a strictly moral and intellectual education, with a view to develop its natural capabilities, it would eventually eclipse all its compeers.

According to phrenology, the merits of the far-famed mocking-bird of North America (*Turdus polyglottus*), have been grossly exaggerated ; our own blackbird (*T. Merula*), ought far to surpass it in melody ; for on comparing skulls of these two birds now before me, I find the cerebral development of the latter to indicate greater musical talent than is possessed by the more celebrated songster of the western woods and prairies.

The organ is large in the sandpipers and godwits (*Totanus*, *Tringa*, and *Limosa*), whose harsh cries must henceforth be deemed musical, although usually composed of a single note. Several species of owls, of the genera *Strix* and *Surnia* for instance, have the organ in question well developed, and consequently ought to sing, and not hoot, as they have hitherto done. The partridge (*Perdix c nerea*), and the sparrow-hawk (*Accipiter Nisus*), are similarly pro-

vided with this organ, although the faculty has never been shown by either of these species.

More illustrations might be adduced in favour of the view I have been advocating, but the above will, I trust, suffice to show how little faith can be placed in the attempt of phrenologists to assign "a local habitation and a name" to any of the mental faculties or instincts manifested by birds. I could with pleasure dwell longer on this subject, were my limits not far too circumscribed to enable me to develop my views, which, however, I trust, will shortly be presented to the public through another medium.

The above short analysis of the doctrines of comparative phrenology, may be perceived to be a mere sketch, my object having been simply to direct the attention of my fellow-students to the futility of all attempts to explain the psychological acts of birds, and indeed of all the lower animals, by means of a system so completely at variance with nature herself, and the little we *do* know of the operations of the brute mind. I have throughout carefully avoided touching on human phrenology, properly so called, the inconsistency and consequent absurdity of which have been pointed out by abler hands:* my sole endeavour has been to take up that part of its doctrines which treats of the instincts of birds, a subject, which, though fraught with interest, has hitherto been neglected. If there be not that lucid arrangement in the present paper, so much to be desired in all philosophical investigations, I

* I allude particularly to the admirable Treatise on Phrenology, in the Encyclopædia Britannica, by Dr. Roget.

consider the nature of my subject a sufficient excuse. Phrenology is *not* inductive; the evidence on which it rests is not cumulative, but disjunctive, and consequently all its propositions must be combated individually.

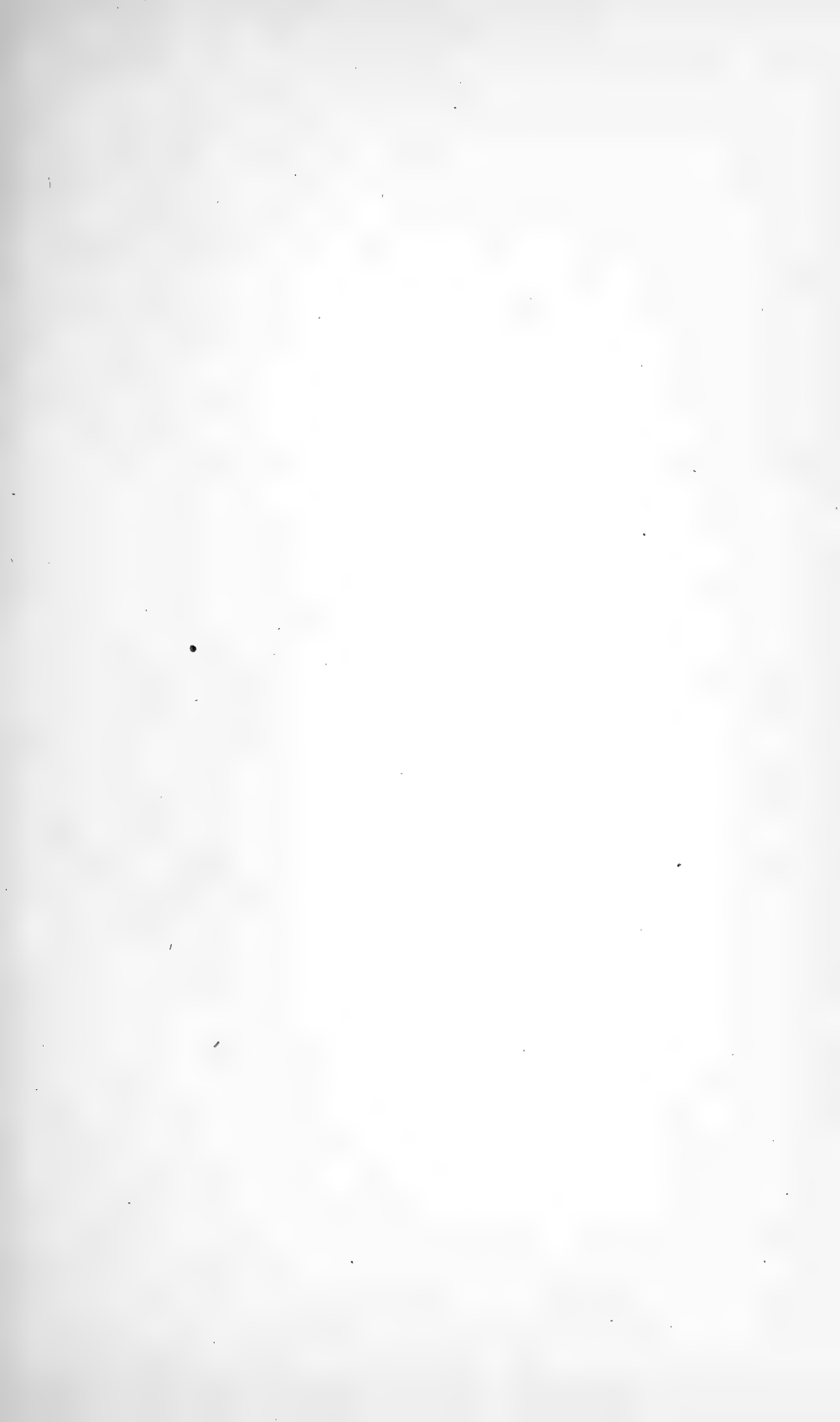
I have shown that the term INSTINCT has been grossly misunderstood by phrenologists,—that all attempts to show an analogy between cerebral development and mental qualities have proved unsuccessful when applied to birds,—that it is impossible to detect minute differences in the form of the brain, by outward inspection of the cranium,—that the absence of convolutions militates against the doctrines of phrenology,—and that in a clamorous appeal to nature herself, as a last and unfailing resource, its dogmas are seen by every unprejudiced person to vanish before the meridian splendour of truth itself, at whose touch all false reasoning, and hypothetical conclusion, are resolved into their original constituents,—prejudice and error.

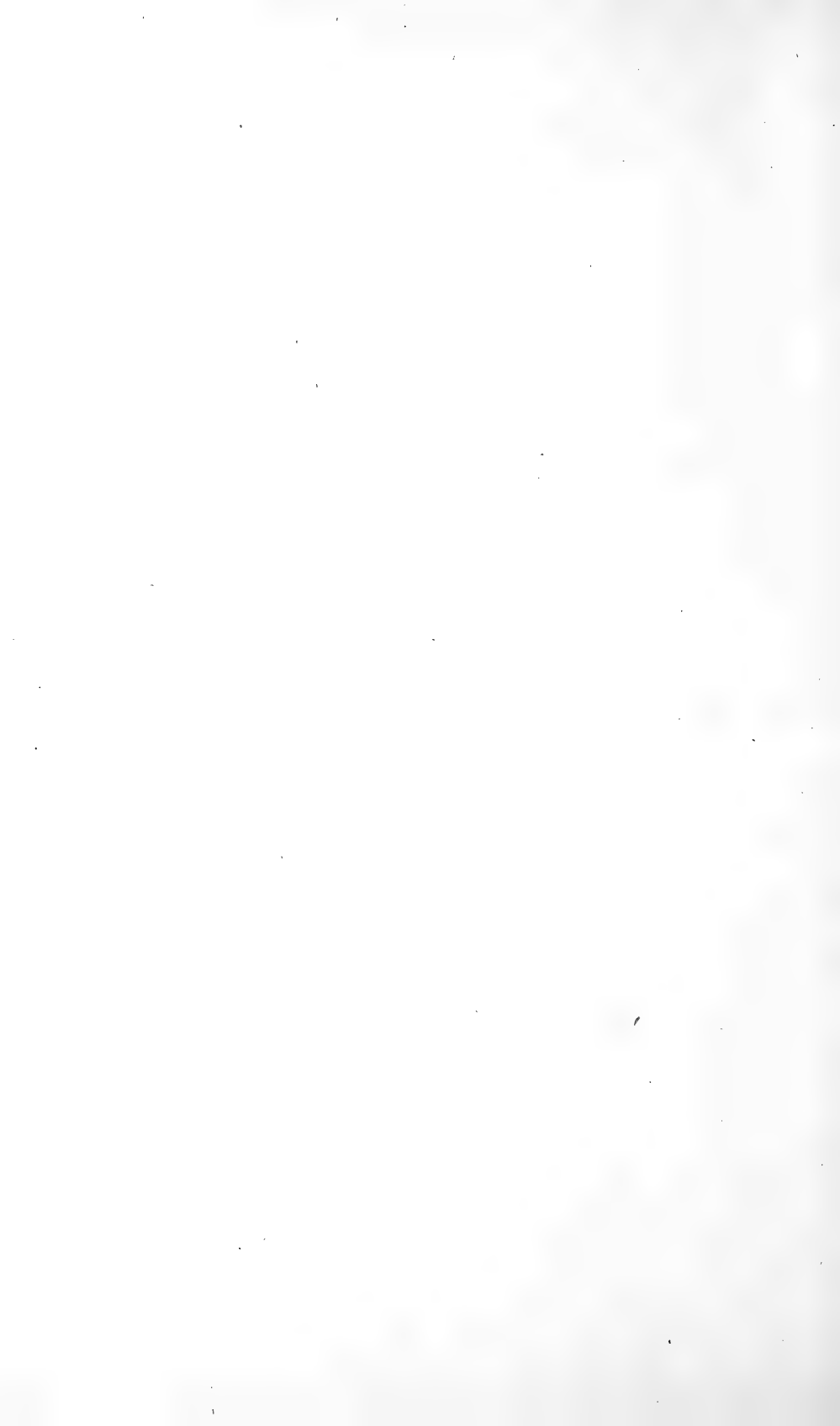
[In order to satisfy the reader that the observations which serve as the basis of the preceding remarks have not been derived from the examination of a few species only, I may state that my collection of skulls of birds (commenced in the autumn of 1838 for phrenological purposes) already consists of specimens of 239 species, belonging to 115 genera, and contains representatives of the principal families of that class of animals:—all which specimens have been compared with each other, in connexion with the known habits of the birds, before I ventured to draw the conclusions stated in this paper.]

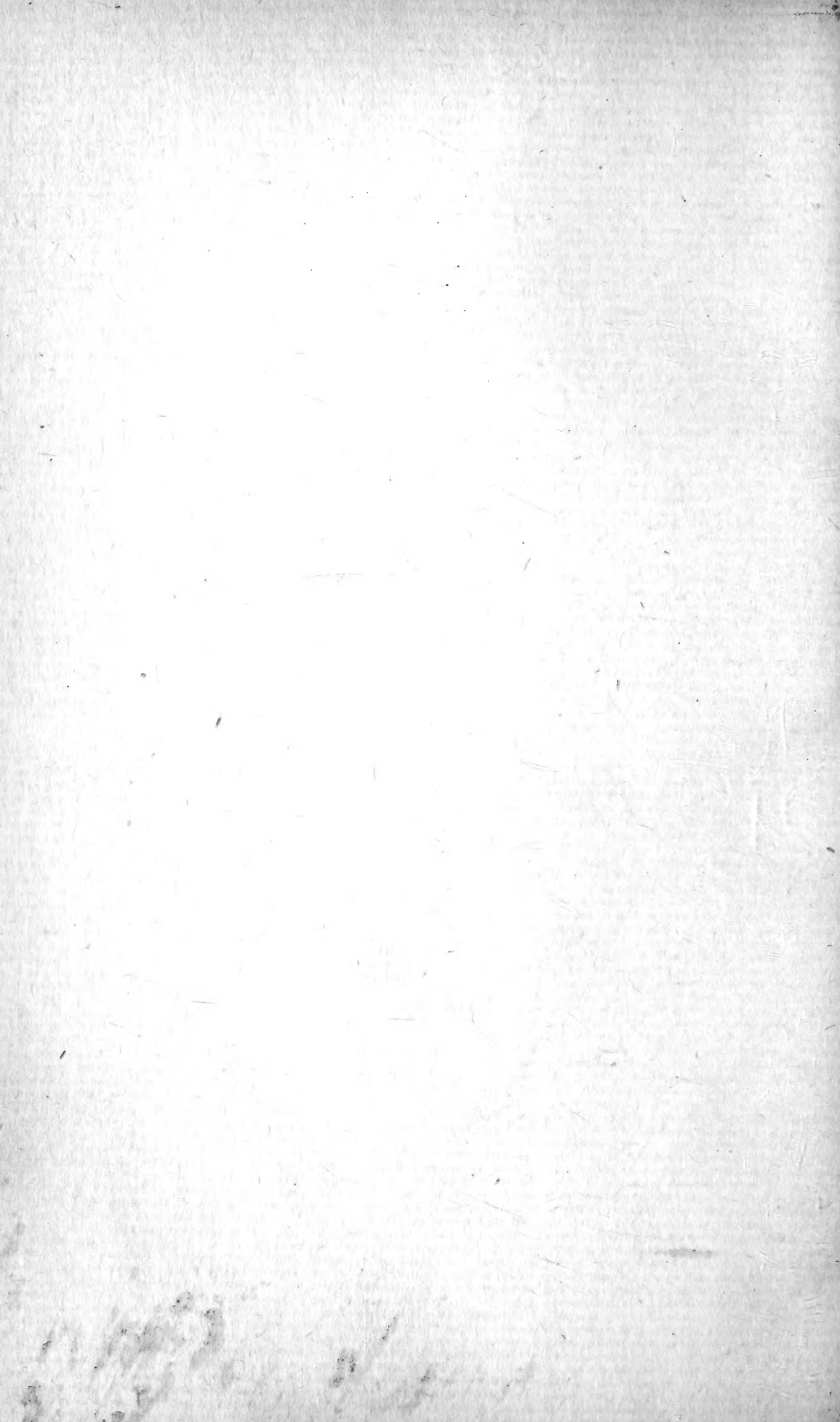
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