# GÄTKE'S 'HELIGOLAND.'[1]

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HERR GÄTKE'S 'Heligoland' is beyond question a remarkable book. Its author and the island from which it takes its name are both unique in the annals of ornithological literature. It is not therefore surprising that the work has been received with almost unexampled interest by bird lovers and bird students the world over. 'Heligoland' was originally published in German in 1892, and has now received the compliment of being made accessible to English readers.

Heligoland is a small island at the mouth of the Elbe in the North Sea, about fifteen miles distant from the mainland. It is triangular in outline, slightly over a mile in length, but much less than a square mile in area. Being treeless and almost destitute of shrubbery, it affords slight chance of concealment for the birds which visit it, often in enormous numbers. But its bird population is mainly transient, only one species of land bird, the ever-present House Sparrow, being a regular breeder in any numbers. The island is thus a resting place merely — 'Die Vogelwarte Helgoland,' to borrow the expressive German title of Herr Gätke's book — for migrants, that make it a temporary place of refuge in their long journeys, in most cases tarrying for only a few hours. It also lies at the intersection of two prominent lines of migration, the one a north and south route, the other an east and west route. Here Herr Gätke for fifty years, aided by fowlers, taxidermists, and bird catchers of all sorts, has kept an incessant watch upon the ever-fluctuating bird population of this "bare and rugged isle," with the result of chronicling as visitants to Heligoland not less than 398 species, including a large number of waifs and strays from distant and in some instances most unexpected quarters of the globe. As a result, as already said, Heligoland and Herr Gätke have long been famous in the annals of orni-

[1] Heligoland as an Ornithological Observatory, the Result of Fifty Years' Experience. By Heinrich Gätke. Translated by Rudolph Rosenstock. Edinburgh: David Douglas. 1895. 8vo, pp. xii, 599.

thology. Hence it is natural that his book of over 600 pages, giving a detailed record of his observations and experiences, and of his views on bird migration, its causes and methods, should be hailed with delight by a wide circle of ornithological readers. As Herr Gätke has been awarded honorary membership in all of the leading ornithological societies of the world, it is perhaps not strange that his utterances on the 'mysterious' problems of bird life should be accepted as little short of oracular, and his statements taken at nearly their face value, without special scrutiny or criticism, by a large majority of his readers.

Indeed, 'Heligoland' has been pronounced by an ornithologist of high standing to be "one of the most original, most remarkable, and most valuable books ever written about birds." That it is original and remarkable no one will deny; as to its value there is easily room for difference of opinion. Herr Gätke's observations, it may be well to remember, have been limited to an almost barren island of less than a square mile in extent, with conditions necessarily exceptional, but of such a character as to give highly favorable opportunities for the study of certain features of the migratory movements of birds. But the fact that the conditions are unusual, and the field extremely limited, renders it questionable whether or not the conclusions of a single observer based thereon should outweigh the sum of all other observations made elsewhere, and the inferences and hypotheses of hundreds of excellent observers who have investigated the subject in other lands. Yet if we take Herr Gätke at his own estimate, observations made outside of Heligoland are to be discredited as in some way faulty or erroneous, if they fail to agree with those of the Oracle of Heligoland. At least, as one of his admirers puts it, "the most conspicuous result of his insistence upon the facts in the case is rank iconoclasm. He smashes our idols right and left; he leaves us at the mercy of our fables, helpless for lack of gods to supplicate, for he sets up none of his own in their places" (Auk, XII, p. 343). In other words, on most points he takes issue with what may be termed the general consensus of opinion of ornithologists, affirming that they are wrong while he must be right, or else declaring that all previous opinions and hypotheses are not only without foundation, but the point at issue is a riddle

beyond the power of man to solve. Hence we are led to a rather close scrutiny of evidence and arguments so universally iconoclastic.

'Heligoland' is indeed a remarkable book, and an important contribution, from many points of view, to the literature of ornithology; but it contains much that is set forth as fact which on close examination proves to be mere conjecture. On many points which Herr Gätke treats with great positiveness his knowledge is obviously as limited as the little field which has been the scene of his life-long labors.

Herr Gätke's book consists of three parts, entitled respectively 'Migration of Birds' (pp. 3–148), 'Changes in the Color of the Plumage of Birds without Moulting' (pp. 149–164), and 'Account of the Birds observed in Heligoland' (pp. 165–588). Part I is divided into eleven chapters or sections, relating to as many phases of the general subject of bird migration. The first chapter treats of the 'Course of Migration generally in Heligoland,' and gives a history of bird movements at the island chronologically by months from January to December. In style of treatment it is not unlike accounts that have been given of many other localities by various local observers, being a sort of calendar of the bird year at Heligoland. Its special interest is therefore due to the peculiar nature and geographic position of the island in relation to the migration routes of birds, and the long period of observation on which the account is based.

Chapter II (pp. 24–45) treats of the 'Direction of Flight.' Here his observations and conclusions are quite at variance with those of most observers at other points. He scouts the idea of 'Zugstrassen,' or restricted lines of migration, or concentrated migration by favorite routes, and affirms that "the migratory movement is performed by a broad front," which corresponds to the breadth of the breeding area. He says, for example: "The view, much discussed in recent years, that migrants follow the direction of ocean coasts, the drainage area of rivers, or depressions of valleys as fixed routes of migration, can hardly be maintained. Too many facts are directly at variance with this assumption" (p. 24). In proof of his view he cites the east and west migration of many species which, breeding in northeastern

Asia, pass Heligoland, and later turn southward to reach their winter quarters in southwestern Europe, crossing in their westward autumnal journey, nearly at right angles, all the principal mountain chains and rivers of northern Asia and Europe. River valleys being "generally endowed with a very varied vegetation and a rich insect life" are consequently "welcomed by the majority of migrants as most desirable feeding-places," and they are hence used as halting stations for "rest, food, or water,"— which fact, Gätke claims, has given rise to the idea, in the minds of superficial observers, that the migrants here met with are following the courses of the streams.

Herr Gätke recognizes at Heligoland two distinct lines of autumnal migration,— one from east to west, and another, of equal importance, from north to south (p. 37). The spring migration, in the case of the east to west migrants, differs markedly from the autumnal movement, in that the spring journey is much more rapid and made along the shortest line between the winter quarters and the breeding stations, whereas in the fall migration it describes two sides of a triangle,— namely, from eastern Asia to the coast of central Europe and thence abruptly south to northern Africa. It is further affirmed that "birds perform the journey from their winter quarters to the breeding stations, if possible, in one uninterrupted flight." That such is not the case in North America is amply proven, were there no other evidence, by the data given in Cooke and Merriam's 'Bird Migration in the Mississippi Valley,' where the daily progress of some sixty species has been traced from the Gulf of Mexico to Canada and has been found to be only from about fifteen to thirty miles per day, according to the species, and whether the species is an early or a late migrant. This seems much better evidence than the avowed basis of Herr Gätke's assumption, namely, "observations made here [at Heligoland] incidentally during the capture of birds at night at the lighthouse" (p. 44).

Chapter III (pp. 46–62) is devoted to 'Altitude of the Migration Flight.' On this point, in speaking of "migration proper," or "those large, extensive movements" which on the one hand conduct our migrants from their breeding homes to or very near their winter quarters in one uninterrupted flight, "and on the other

hand, in spring, convey them in the opposite direction from their winter quarters to their breeding haunts,— the uninterrupted continuity of the flight being still more marked in this latter phase of the migratory phenomenon,"— he says: "Observations extending over many years have led me to the conclusion that, as long as migration proceeds under normal conditions, this elevation is, in the case of by far the larger number, so great as to be completely beyond the powers of human observation; while we must regard as disturbances and irregularities of the migration movement proper, due to meteorological influences, such portions of it as are brought within our notice" (p. 46). Apparently he would place the height of the migration flight as high as 15,000 to 30,000 feet, and brings forward evidence to show that some birds attain at will a height of even 35,000 to 40,000 feet. He might have brought much stronger evidence to support his conclusion than any he cites had he been more familiar with the literature of the subject, for the observations made repeatedly in this country with telescopes directed toward the disk of the full moon during migration nights, demonstrating the fact that birds reach an altitude of from one to three miles in their migratory flights, is not mentioned.[1] In this connection he dwells upon the fact that birds must be very differently constituted from man or any other warm-blooded creature to be able to sustain life in such rarefied air-strata and under the low temperature of such elevations. He also comments at length on the ability possessed by many birds to vary apparently the specific gravity of their bodies, as in the case of various diving birds, and as must also be the case with birds that rise to great altitudes in flight.

The main purpose of the high altitude of the migration flight, he believes, is that these high strata of the air offer, for the time being, the most favorable conditions for migration, and render the migrating hosts independent of the numerous meteorological disturbances that affect the lower regions of the atmosphere, but that also the rarefied air of the upper regions presents less resistance to their progress.

[1] See Scott and Allen, Bull. Nutt. Orn. Club, VI, 1881, pp. 97–100, 188; Chapman, Auk, V, 1888, pp. 37–39.

In Chapter IV (pp. 63–73) the 'Velocity of the Migration Flight' is considered. On this subject there is unfortunately very little positive information; hence the field is a tempting one for conjecture and inference, and Herr Gätke has not neglected to make use of it. The actual data bearing on the subject which he is able to cite does not by any means favor the high rate of speed he assigns to migrating birds; namely, 180 to 240 geographical miles per hour, not for a single hour but for many hours consecutively! The character of his proof of this proposition is fairly shown by the following. His crucial test, and the main basis of his assumption, is the spring migration of the Red-spotted Bluethroat (*Cyanecula suecica*), a bird which winters in Egypt and the neighboring countries and breeds mainly north of the 60th parallel in northern Europe. On the negative evidence that it has not been recorded as occurring anywhere in numbers in spring between the Nile Valley and Heligoland, it is assumed as beyond question that the majority of the individuals of this species, "under normal conditions, and in the absence of meteorological influences of a disturbing nature, accomplish their migration in one uninterrupted nocturnal flight, . . . thus accomplishing a distance of at least 1600 geographical miles within the space of nine hours" (pp. 65, 266), hence maintaining an average rate of speed of 180 miles an hour. The Bluethroat is cited as positive proof that other birds having the same winter quarters and breeding range must also migrate in the same way (p. 67). But he goes even further than this, citing as "the most striking and incontestable proof" of his assumption the American Golden Plover (*Charadrius dominicus*), which, he affirms, migrates in autumn from Labrador to northern Brazil in a single uninterrupted flight, over a distance of 3000 geographical miles. He says, "we may probably assume fifteen hours as the longest spell during which a bird is able to remain on the wing without taking sustenance of any kind"; and the velocity of flight of these birds would, on this assumption, "amount to 212 geographical miles per hour" (p. 69). Even this astonishing rapidity of flight he believes is not to be regarded as "either exceptional or isolated," and that the same birds "may be able to accomplish even greater feats during the spring migration." Indeed, recurring again to the Bluethroat, he believes that those

individuals which pass on from Africa to the Scandinavian peninsula, including the majority of the representatives of the species, "accomplish during the same May night a distance of 2000 to 2400 geographical miles. This would," he adds, "of course, give as a result a velocity of four miles a minute," or 240 miles an hour!

Whatever the Bluethroat may really do, the kind of migration ascribed to it is not that well known to characterize the majority of birds during the spring migration; indeed, Herr Gätke finds it necessary to explain away the observations of others, or to disregard such of their testimony as may be known to him, as of no special importance when weighed in the scale with his own "fifty years' experience" on the little island of Heligoland. Thus he says: "It has been supposed that birds are in the habit of breaking their migration journey without any very powerful disturbing cause both in autumn and spring, at the former season on reaching latitudes not so far south as those of their normal winter quarters, and in spring before they have arrived at their breeding stations. *With this assumption*, however, *my own experiences on this island*, accumulated for many years, *are at variance*." This quotation, especially the portion here italicized, shows the attitude and spirit in which Gätke approaches the many general questions he discusses,—his own little island of a few acres in extent, nearly woodless and barren, and his own experiences limited thereto, being placed in opposition to the accumulated experience of thousands of observers scattered over the greater part of the earth.

It is quite possible that many birds, the Plovers among them, attain not unfrequently a speed of 100 to 150 miles per hour, and are able to maintain that rate for a number of consecutive hours, but that birds as a rule fly at this rate, or make the journey between their winter stations and breeding grounds "in one uninterrupted flight" is not by any means the rule, if indeed it be the case in any instance. To marshal the well-known proof of this would be almost to insult the intelligence of the experienced ornithologist. Let it suffice to say that where trustworthy observations have been made regarding the ordinary flight of Ducks, Pigeons, Hawks, and some other species, the rate of speed has been rarely found to exceed 35 to 60 miles per hour.

Again, in regard to the American Golden Plover, which he believes makes the journey from Labrador to northern Brazil "in one uninterrupted flight," it may be worth while to mention that this species is a well-known autumn migrant all along the Atlantic coast of the United States, and in the West Indies, during a period of from four to six weeks, varying in abundance, and in the length of stay of any particular flock, according to the weather, being common at numerous well-known points for from a few hours to a few days, in the case of heavy easterly storms, and rare during continued fair weather.[1] Because there is a record of flocks passing the Burmudas without stopping, it does not follow that these flocks may not afterwards have stopped at some of the many islands of the West Indies, or that flocks that pass the Massachusetts coast without stopping may not halt at points on the coast further south; for, as said above, the species is of frequent occurrence as an autumnal visitor all along the Atlantic coast from New England to Florida and in the West Indies.

Chapter V (pp. 74–99) considers the 'Meteorological Conditions which influence Migration,' as the force and direction of the winds, the state of the atmosphere as regards moisture, cloudiness, temperature, etc., all of these influences being intelligently discussed, and their effects illustrated by reference to the author's experiences at Heligoland.

In Chapter VI (pp. 100–113), on the 'Order of Migration according to Age and Sex,' the author's dogmatism and disregard of whatever occurs outside of Heligoland stands prominently forth. "The question," says Gätke, "as to the order of age and sex in which migrants take up their annual journeys is one on which, up to the most recent time, there have prevailed more serious errors than on any problem connected with the migration phenomenon. It was generally supposed that the old birds acted as the leaders, teachers, and guides of the young ones on their migrations; and although this view was not based on any observations whatsoever in Nature, it seemed so natural and reasonable that it was accepted in pure good faith, without subjecting it to

[1] See Mackay, Auk, VIII, 1891, pp. 17–24 — record of the autumn migration of this species in Massachusetts for thirty years. *Ibid.*, IX, 1892, p. 199; X, 1893, p. 79; XI, 1894, p. 75; XII, 1895, p. 78; XIII, 1896, pp. 89–92, *passim*.

the test of observation and experiment [p. 100]. . . . But this representation . . . is really nothing more than a plausibly sounding fable, in which — quite after the manner of a fable — the old and wise individuals represent the teachers and guides of simple youth. In reality, however, this explanation of the question not only lacks all support of actual facts, *but is entirely at variance with every observation hitherto made in Nature*" (p 102). While there is perhaps a taint of the fabulous in the case as here put, if taken too literally — namely, that the young are led and guided by the old and experienced — it is difficult to understand the arrogance and dogmatism of the portion of the above extract here printed in italics, since numberless observers of the widest experience and utmost trustworthiness take the opposite view from Herr Gätke on this matter. While Gätke's experience may exceed that of most other observers as regards length of time, it is confined to a minute locality and to exceptional conditions, whereas the published evidence he so loftily declares not to exist is based on the experiences of observers whose field of research includes vast areas and more normal conditions.

Speaking of Heligoland, he thus summarizes the "incontestable result of all the numerous phenomena" there observed as follows: "1. That under normal conditions in the case of the 396 species occurring here, with the exception of a single one [the Cuckoo], the autumn migration is initiated by the young birds, from about six to eight weeks after leaving their nests. 2. That the parents of these young individuals do not follow till one or two months later. 3. That of these old birds again, the most handsome old males are the last to set out on the migratory journey. In spring this order is inverted" (p. 102).

This explicit statement that in the case of these 396 species (with the one exception noted), "the autumn migration is initiated by the young birds, from about six to eight weeks after leaving their nests," seems at first sight to carry great weight, and we naturally turn to Part III of the book to learn what these species are and their status as Heligoland birds. An examination of the list soon reveals the fact that over 200 of the 396 species must be classed as merely stragglers to Heligoland,[1] more than one half of

[1] See Coues, 'The Auk,' Vol. XII, 1895, pp. 322–346.

which have been detected in Heligoland only once each, in a period of fifty years, and half of the remainder but twice each! Furthermore that in many instances these records are spring records, the species having never been taken in Heligoland in autumn. A further examination of the list shows that not more than one-third of these 396 species are really in evidence as regards the autumnal migration. Notwithstanding this misleading statement as to the extent of the evidence, we cannot suppose that Gätke is mistaken in regard to the order of appearance of the old and young birds at Heligoland after the breeding season in the case of such familiar species as the Starling, the Wheatear, the Pied Flycatcher, the Whinchat, the Redstart, Willow Warbler, the Ortolan Bunting, etc., the young of which are reported as appearing in Heligoland from the last of June or early part of July onward till September, weeks in advance of the old birds. As these birds all breed commonly on the adjoining mainland, it is doubtful whether these early visits of young birds indicate anything more than local movements of young birds prior to the season of true migration. As only one land bird, the ubiquitous House Sparrow, breeds regularly in numbers on this little unforested island, any visitors from the neighboring mainland after the breeding season appear to be entered in Mr. Gätke's list of fall migrants. Indeed it is evident that these young birds, only a few weeks from the nest, must be many of them still in nestling plumage, and hence unfitted to start on their regular autumnal migration.

The case, however, is different with the young Golden Plovers (*Charadrius pluvialis*) recorded as arriving at Heligoland the first week in July, since the breeding grounds are more distant. It goes to show, however, that allied (congeneric) species of birds may behave very differently at different places, for it is a well established fact that on the eastern coast of North America the adult birds arrive first in the case of the American Golden Plover.[1] Also it is almost the uniform testimony of our best American observers that as a rule, among song birds as well as

[1] See especially Mackay, Auk, XIII, 1896, pp. 90–92; also Feilden, Ibis, 1889, p. 491.

shore birds, the adults precede the young in the autumnal migration.

In Chapter VII (pp. 114–130), under the head of 'Exceptional Migration Phenomena,' are grouped many facts of interest respecting the season and character of occurrence and sources of origin of the numerous waifs and strays, or chance visitors, which have been taken or observed on Heligoland.

Chapter VIII (pp. 131–142) is devoted to a consideration of the question 'What Guides Birds during their Migrations?' and Chapter IX (pp. 143–148) to 'The Cause of the Migratory Movement.' These are principally made up of destructive criticism of the theories and suggestions of previous writers, his conclusion being that the former question "presents to the savants of our day as great a riddle as it did to the first observer in ages before the dawn of history" (p. 132). He concludes Chapter VIII by saying: "Having thus examined the many various attempts made to explain the wonderful faculty possessed by migrants of discovering the right path of their migration, and shown how insufficient most of them are when confronted with actual facts, observed directly in nature, in the course of more than fifty years' investigations and at a spot so favoured as Heligoland, I cannot say that I feel encouraged to add further to the number of such attempts by others of my own" (p. 142). As he has during the previous chapters advanced theories of his own to explain the various phenomena of migration, usually in direct opposition to those of other students of the subject, and has not hesitated to reject as not worth considering observations made elsewhere if they do not tally with his "fifty years' investigations" on his "favoured little isle of Heligoland," it seems almost remarkable that he should content himself in the present case — after proving (to his own satisfaction) everybody else wrong — with this modest confession of inability to explain this old-time riddle. He discards the idea of definite routes of migration; of topographic features of the landscape,— coast lines, river courses, and mountain chains,— serving as landmarks; and discredits the possibility of a hereditary transmission of knowledge derived from experience. He erroneously assumes that because birds migrate principally by

night it is impossible for them to distinguish the nature of the country beneath them, and that hence if they were possessed of a highly developed local sense of direction it would be of no service to them on such journeys.

In regard to the "immediate cause of the departure of birds on their migrations," he believes "we are confronted with a riddle which has hitherto defied every attempt at a solution, and which indeed we may hardly expect will ever be likely to receive a final explanation. . . . In thus abstaining from setting forth new theories, I have been guided by the conviction, rendered firmer with increasing knowledge of the phenomena, that what at present has been ascertained in reference to the migration of birds furnishes us with no clue, by the aid of which we are enabled to penetrate the depths of this wondrous mystery" (p. 148).

In reality, great light has unquestionably been thrown upon the causes of migration, the manner of its performance, the conditions which influence it, and the factors that aid in guiding birds on their migrations, by the systematic observations so extensively carried on in Europe and in America, during especially the last ten or twelve years. Yet the love of mystery is so inherent in the popular mind, and the habit of viewing the migration of birds as the "mystery of mysteries" in bird life is so firmly fixed, that it is perhaps not strange that a reasonable explanation of all the principal phenomena of the subject should be received as unwelcome iconoclasm on the part of one who clings tenaciously to life-long modes of thought. The "several very ingenious and plausible hypotheses," resulting from "long and profound study," find no favor with Herr Gätke, though favorably received by the newer school of migration observers, who consider the subject as no longer invested in "impenetrable mystery."

In Part II (pp. 151–164) he takes up the subject of 'Changes in the Colour of the Plumage of Birds without Moulting,' in the discussion of which the author displays a depth of ignorance and a misapprehension of simple facts that ill comports with his claim of "having for many years devoted the most unremitting attention" to the subject. He evidently knows little about the way birds

moult, or he would not, as on page 110, consider it "singular how such a bird [as the Hooded Crow] could lose so many of the flight feathers of *both* wings" at the same time, or fail to recognize a spring moult in so many of the species he cites as changing to the breeding dress without any renewal of the plumage.

He says: "The change from the winter plumage to the breeding dress *without moulting* is accomplished in three different ways. The simplest of these consists in the shedding of the edges of the feathers of the winter plumage." This he correctly describes, citing numerous species in which it is exemplified,—a change well known to intelligent ornithologists the world over. The second method, he says, "consists, so far as I have been able to determine without the help of a microscope, in a peeling off of the separate barbs of the feathers, whereby these are stripped of a thin inconspicuously coloured envelope, so that the purer and finer colour previously concealed beneath the latter becomes exposed" (p. 152). In reality this is in part a less marked wearing off of the edges of the feathers mentioned under his first method of change, and in part a slight alteration of colour due to the exposure of the plumage to the influence of the elements. The "peeling" process is an original discovery of Herr Gätke, and doubtless exists largely, if not solely, in his fertile imagination.

"The last and most wonderful process in the colour changes of the plumage of birds, not attended by a renewal of the feathers themselves, consists in an actual, complete, and very striking change in the colour of the feathers, without such alteration being brought about, or even assisted, by any change in their texture. As illustrating the climax of this process," he continues, "we may probably point to the change from pure snow-white to an intense glossy black or blackish brown" (p. 153), as he avers occurs in the head and neck of the Little Gull and in the fore-neck and upper breast of the White and Pied Wagtails, and in the heads and necks of Guillemots and Auks. The manner of this change he describes with a minuteness that seems to bar all cavil at its correctness, were it not for the utter improbability of the case, and the known fact that in the same or allied American species this spring change from white to black is due to moult and a complete renewal of the plumage of the parts involved!

His remarks on the changes of colour in various species of

Limicolæ, and especially in the Sanderling and Golden Plover, is equally absurd and erroneous, although the changes are described with a minuteness of detail that would seem to imply a careful examination of specimens. In fact, he seems to have made such examinations, as he says his observations are based "on fresh examples, in which, by examination of the inner cutaneous surface, it was possible to determine with certainty whether moulting actually took place or not. . . . Where the change of colour proceeds by gradational stages in this manner, the bird under examination completely gives one the impression of being fully in the moulting state, and, in fact, examples of this kind have been sent me by ornithologists of repute in proof of a moulting process. A close and exact examination, however, at once reveals the fact that all these scattered and newly coloured feathers are of perfectly normal size; nor do we find among them any others of half or more than half their full growth, still within the dermal quill [sheath], as would be the case if one were dealing with a moulting individual" (p. 163). On this point it must be said that Gätke was very unfortunate in selecting his material, or very careless in his observations; as ordinarily it is by no means difficult to find in such specimens as he describes plenty of feathers in all stages of growth. How he could have failed to discover them is hard to conceive. His interpretation of the markings and changes he so minutely describes must be due to so strong a preconceived notion of what ought to occur that he was blinded to the real facts in the case. Indeed, according to Gätke, in speaking of the Sanderling, not only does the color of the feathers change but "at the same time the serrated indentations [due to wear] of the worn posterior flight feathers, the abraded tips of the barbs which formed the light lateral markings" are restored. "When this [transformation] is complete, the feathers are of a dusky black colour, the large triangular spots at their margins nearly white, the serrated indentations of the edges of the feathers are filled out, and the whole plumage has the appearance as if it had just been renewed by moulting," — which, in fact, is just what has happened![1]

[1] In this connection see 'The Changes of Plumage in the Dunlin and Sanderling,' by Frank M. Chapman (Bull. Am. Mus. Nat. Hist., VIII, 1896, pp. 1–8), written with special reference to Gätke's remarkable statements.

If his statements are true, not only does an old, long-worn feather receive an influx of pigment, but has its worn and ragged edges restored by the addition of new growths to the edges,—"a restoration of the worn and blunted barbs to their previous entirety." In other words, we must suppose that a feather after months of wear is capable of rejuvenation to the extent of not only developing a system of circulation for the transmission of pigment through the shaft and out into the ultimate divisions of the barbs, but also solid matter for the restoration of the structural parts of the feather which have been worn away by abrasion! Thus, in speaking of the Spotted Redshank, the Marsh and Wood Sandpipers, he says the light triangular spots on the margins of the flight feathers and larger feathers of the upper parts "are so little able to stand wear, that by the end of the winter they have almost or entirely disappeared, as a result of which the remaining portions of the feathers have acquired jagged edges something like the cutting edge of a saw. It is this edge which, in the course of the colour changes, is restored" (p. 157).

That such statements can be made seriously by any intelligent ornithologist, and still more be quoted with approval by prominent authorities on bird matters (see Auk, XII, p. 346, and Ibis, Jan., 1896, p. 142), is almost beyond belief. In short, it would be hard to find a greater amount of error in an equal space than is crowded into Herr Gätke's fifteen pages on 'Change in Colour of the Plumage of Birds without Moulting,' or more astonishingly absurd statements.[1]

If this is the result of "the most unremitting attention for many years" to this subject at Heligoland, which "supplies us with an abundance of material for observation," we may perhaps reasonably feel a little distrust of some of Herr Gätke's observations and conclusions based on "fifty years of investigation" at

[1] It may be added here that this chapter was published in substance by Herr Gätke in 1854, in the 'Journal für Ornithologie,' pp. 321–327, in an article entitled 'Einige Beobachtungen über Farbenwechsel durch Umfärbung ohne Mauser.'

For further comment on this paper of Gätke's, and on others of similar character by other authors, see Bull. Am. Mus. Nat. Hist., VIII, 1896, pp. 13–44.

this favored island on the general subject of migration, when, as is so often the case, they run counter to the observations of ornithologists at large, with more favorable opportunities for getting at the general facts of migration as displayed over wide areas. It is not an agreeable task to pick flaws in a work received in many quarters almost as oracular,—a work, moreover, so pleasantly written, and apparently with such sincerity of purpose, and containing so much of real value; yet to let such errors pass unchallenged is not the way to promote truth, or to advance the science of ornithology.

Part III (pp. 167–588) gives an 'Account of the Birds observed in Heligoland.' These number 396 (+ 1 added at p. x = total 397),—an extraordinarily large number for a locality of such limited area. A careful synopsis of the list (see Coues, Auk, XII, 1895, pp. 324–342), however, shows that fully one-half are stragglers. Thus, during fifty years, 97 species have been taken or observed only once each; 33 species, only twice each; and 70 species, three times or more. About 130 species are regular migrants either in spring or fall or during both seasons, while about 50 are more or less regular winter residents. Some 16 species have been known to breed, but some of them in only one or two instances, the others, except one, more or less irregularly.

Among the stragglers, the occurrence of fifteen exclusively North American species is recorded, which Herr Gätke shows (p. 124) most probably in nearly every instance reached Heligoland by a journey across the North Atlantic. Other stragglers are casual visitors from the far North; many others, from the far East, and others still from the South, are species which have far overstepped their usual boundaries.

In commenting on the large number of 'casual visitants' that have been taken on the little island of Heligoland, Herr Gätke considers that their appearance in such numbers on so small an area is proof that an incomparably larger number must annually pass across Europe. If, he says "twenty, fifty, or even a hundred examples of Richard's Pipit occur here in one day [of course an exceptional occurrence], these numbers can only represent a minute fraction of the quite incomputable quantity of these birds

which are travelling at the same period from Daüria to Western Europe."

Gätke's list is copiously and interestingly annotated, the annotations often occupying several pages, the records being in most instances very fully and satisfactorily given. The nomenclature, however, is antiquated, being for the most part that of Naumann, and hence dating almost from Gätke's boyhood. In the English translation the equivalent modern names are given in footnotes, when different from those used in the text, as is usually the case. In a few instances the identifications may be open to question, especially in some of the few cases where the species was only observed and not actually taken.

With all its imperfections 'Heligoland' is a book of great interest and value, Part III being a particularly useful contribution to the literature of ornithology. It is also a work that is likely to do much harm, for it is its sensational and inaccurate parts especially that find their way into the current literature of the day, and particularly into magazines and books devoted to the popularization of natural history.

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## A REVISION OF THE NORTH AMERICAN HORNED OWLS WITH DESCRIPTION OF A NEW SUBSPECIES.

BY WITMER STONE.

IT is not a pleasant task to overthrow a scientific name long in use, but under certain circumstances it seems unavoidable, and the case of *Bubo virginianus subarcticus* (Hoy) is an instance of this kind.

Some years ago while engaged in cataloguing the Owls in the collection of the Academy of Natural Sciences of Philadelphia I found the type specimen of "*Bubo subarcticus* Hoy." The bird was mounted, and on the under side of the stand were written the