their spring and fall migrations. During March an extremely narrow portion of this zone, namely the belt of sand bars lying next the ocean, appears to constitute an early migration highway for Myrtle Warblers (independent of interior migrating birds) which have wintered in the Tropics.

If it be true that these warblers came from tropical winter quarters, then the migrating instinct, no doubt preceded by physiological changes, developed earlier among birds that wintered under conditions of great humidity and high temperature than among those wintering in the cooler United States; and I have given temperature conditions during February for the three southern Atlantic states with comments on the behavior of the Myrtle Warblers wintering in Georgia and South Carolina to emphasize this fact and to contrast the absence of any observable migrating tendency among these birds wintering even thirty miles from the ocean near Charleston at a time when a host of the same species was moving by them northward along the coast.

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PROBLEMS OF FIELD IDENTIFICATION.[1]

BY LUDLOW GRISCOM.

AT a meeting of the Linnaean Society of New York when a school boy, I reported having seen a Bicknell's Thrush, my indentification being based on the erroneous supposition that its call-note was diagnostic. The resultant storm of criticism rendered me practically speechless. Then and there I planned to do my best to become a reliable observer and to investigate the scientific possibilities of sight identifications. So little did I have to say at that Linnaean Society meeting that my credibility was entirely eliminated, and for over two years nothing I reported was given any credence or entered in the proceedings. In the years that

[1] Read before the thirty-ninth Meeting of the A. O. U. at Philadelphia November 10, 1921.

have passed no event hurt more or was more beneficial. I can claim, then, a full understanding of and sympathy for the amateur bird student and his point of view. Recently I have been forced at times into the position of judging or criticising other people's records. This has given me the opportunity of learning the point of view of the trained naturalist, who is responsible for the scientific accuracy of what he publishes.

It is a waste of time to discuss the importance and necessity of sight identifications when it comes to studying habits, life-histories, migration, and local or detailed distribution. Here where we are dealing with the usual and the average, the normal rather than the exceptional, one record can check another. The cumulative value of the data collected under these heads by amateur students all over the country is too well known and obvious to require elaboration. Yet before I pass on to my main theme I should like to express my own sense of indebtedness to these bird lovers, who make no claim to being scientific ornithologists, but without whom our knowledge of American birds could not have reached its present development. My reason for wishing to make this acknowledgment of their assistance as full and complete as possible is that I am going to attempt to show that, by the very nature of the laws of evidence, this same help cannot be extended by the amateur observer to so great an extent in the determination of the abnormal and exceptional. The failure to recognize this distinction is, I believe, the cause of the only point of friction that disturbs the good relations between the professional and amateur in our subject; for the only phase that presents any real difficulty to harassed editors, or which causes hard feelings in the bosom of the amateur, is when an unprofessional or untrained observer reports the occurrence of rare, unusual or accidental birds in some local area, and it becomes incumbent upon the reviewer to determine the scientific value of this testimony. Just how difficult and disagreeable a task this can be is, perhaps, only known to those who have experienced it, and who receive angry or insulting letters.

What birds *can* be satisfactorily identified in the field? When is a sight record of scientific value?

It is to be noticed that these are two distinct questions. The first can be answered by considering only the diagnostic characters

of the bird, the second involves also the characteristics of the observer. To take a specific parallel from another field, our first question asks whether typhoid or measles can be identified without killing the patient and performing an autopsy. The second asks under what conditions a diagnosis of these diseases shall be taken as establishing their presence as a scientific fact.

Let us take these two questions in order, considering first the possibilities in sight identification. They are very much greater than many people suppose, greater I believe, than even many professional ornithologists believe, if they have not specialized in field observation. To the beginner sparrows look pretty much alike, but the Vesper is picked out by having white outer tail-feathers. No one who knows all the sparrows well bothers to identify a Vesper sparrow in this way. The pattern of its back is distinctive, and the color effect of the side of the head is diagnostic. Comparatively few people in identifying a Jay need to see its crest or its blue color. In fact bird-books mention only the most conspicuous characters of our birds.

I have drawn up for consideration two lists, one of birds which it is practically impossible to distinguish in life, the second of birds which trained field ornithologists find very difficult to distinguish satisfactorily. These lists represent not only my own opinion but also the opinions of trained field ornithologists with whom I have had the privilege of association in the field. The territory included is the eastern United States. Accidental visitants and subspecies are omitted from consideration, but this does not mean that they are of necessity unidentifiable.

The list of practically impossible birds follows:—Immature Forster's, Arctic, and Common Terns; females of the two Widgeon and the two Golden-eyes; the two Scaups; immature American and King Eiders; males of the larger species of *Accipiter* compared with females of the sm ller species; non-breeding Alder and Acadian Flycatchers; immature Blackpoll and Baybreasted Warblers. These are birds for which I have never been able to discover a reliable diagnostic field character.

With the exceptions above noted, in my opinion it is *possible* to identify every species of bird in the Eastern United States in life in any of its plumages. By "possible" is meant that the bird in

question possesses a character of color, size, or voice which is observable under such conditions of light, proximity, or direct comparison as the particular case may require. It follows, therefore, that a possible identification might be very difficult but never wholly improbable. The list of birds that unquestionably belong in the very difficult class follows:—Immature Parasitic and Long-tailed Jaegers; Ring-billed Gull; adult Forster's, Arctic, and Common Terns; adults of the two Cormorants; female and immature American and Red-breasted Mergansers; female Ring necked Ducks; Snowy Egret and immature Little Blue Heron; the immature Night Herons; Semipalmated and Western Sandpipers; the two Yellowlegs; immature *Buteos*; breeding Alder and Acadian Flycatchers; Fish Crow in midsummer; Bronzed Grackle; the Sharp-tailed Sparrows.

As a general principle these birds can only be identified by trained ornithologists under very favorable circumstances. In any locality where they would be rare or casual, they should be automatically transferred to list 1. To avoid argument it may be stated that a bird is listed as difficult to identify if the diagnostic character is only occasionally noticeable. Thus the Alder Flycatcher is easy to identify if it sings, but as a migrant it usually does not. The Ring-billed Gull is easy to identify if you see the color of its legs, but usually you cannot get near enough. As neither of these events is wholly improbable, identifying either species is a perfectly good possibility. In birds of list 1, however, it is wholly improbable that a sufficiently near approach to see the diagnostic character could possibly be made. It is also obvious that the more inexpert the observer, the more birds become difficult to identify.

With this brief discussion of the possibilities in sight identification we can turn to our second question, a much less popular theme. To mention two minor points first. The notes of the Starling require us to be more careful in listing as heard certain native species which it mimics. Mute Swans having become feral in several sections of the New York region, renders all Swans unidentifiable except under most improbable circumstances, and in this connection I see that the Mute Swans on the Hudson River near Staatsburg have finally burst into print in the last 'Auk,' as Whistling Swans

though such an identification has been successfully suppressed on several occasions.

With the exceptions already noted it may be confidently asserted that all so-called difficulties or inaccuracies of identification and the doubting of records by ornithologists are due to the defects of the individual student and not the bird. These defects are divisible into four catagories.

(a) Physical defects of eye and ear.

(b) Natural inaptitude for the study. The best illustration of what I mean by this is a woman who was constantly seeing the Prothonotary Warbler in Central Park in New York City without gaining credence. Even after this strikingly attired Warbler had actually occurred in the Park, and she had seen the genuine article daily for a week, she pointed out a female Scarlet Tanager and a Yellow-throated Vireo on two subsequent occasions as Prothonotary Warblers.

(c) Mental attitude of the observer. By this I mean, in part, list-crazy enthusiasts, whose one idea is to get as large a daily, monthly, or yearly list as possible, and whose greatest happiness is to add some rare or casual visitant to their list. As this attitude is neither ornithological nor scientific, their observations are unavoidably open to suspicion.

(d) Ignorance and lack of study. This is by far the most important and wide-spread defect. It causes 99 per cent. of the misidentifications of bird-students, and is responsible for 99 per cent. of the difficulty which professional ornithologists have in that most unwelcome task, judging the sight records of others. No one can be blamed for physical defects or natural inaptitude for a given subject, and it would be absurd narrow-mindedness to expect every one interested in birds to have a scientific attitude of mind, but if the student wants to make scientific records by sight identification, ignorance of his subject and an unscientific mental attitude cannot possibly be condoned, and will render such records liable to suspicion. A recent illustration of this may serve to clarify the principle involved. The Willet is by no means rare on Long Island in fall, but is excessively rare in spring. A very enthusiastic bird-student called me up, and mentioned as a very fine find a Willet seen in August. "Of course," said he, "the Willet is a

regular spring migrant, but I never saw one in the fall before." When asked for his spring observations, he said he would have to look them up, as they had not made much impression on his mind. In spite of the fact that the Willet is one of the easiest shore-birds to identify correctly, the committee now preparing a New York local avifuana would, naturally, be entirely unjustified in foisting such records on the literature of ornithology, and it would surprise me if any one but the observer himself would disapprove of this ruling.

Enough has already been said under limitations to indicate that the difficulty in judging sight records lies almost entirely in the human equation. "Lack of study" is a purely relative matter, and knowledge of a subject can vary from 0 to 100 per cent. The principle underlying the whole question is roughly as follows. The correctness of a sight identification rests upon the unsupported testimony of the observer and is an opinion of his. The weight of this opinion cannot have a higher percentage rating, than his knowledge of the subject has to complete knowledge. That is, if he only knows 80 per cent. of the facts bearing on the particular case, his opinion cannot possibly have a weight greater than 80 per cent. This is merely applying to ornithology the rule of logic that any conclusion is worth only what the facts on which it is based are worth. Except under very exceptional circumstances an opinion must be worth approximately 100 per cent to be of definite scientific value, and the "human equation" reduced as near to zero as possible. The scope of an exact science is increased by facts, not by probabilities. The only factor modifying this principle is what may be termed the relative identifiability of the bird. An adult male Scarlet Tanager, a Pelican, or a Chicken are so easily identified that the "human equation" is automatically greatly reduced and the value of the opinion greatly increased. The more difficult the identification of the bird, the more the "human equation" counts.

Perhaps it might interest many bird students to take up the point of view of the scientist, who has to pass on the validity of sight records, and see what he has got to have in the way of information to solve this problem of the "human equation." Let us return to our simile of the doctor. You have a severe pain in

your insides, the doctor arrives and listens to your symptoms. Suppose he is quite non-plussed, never heard of such symptoms before, goes home, scrabbles through the standard medical works to learn how to tell symptoms of colic and appendicitis apart, and writes you confidently a day or two later that he has looked your symptoms up in all the text-books, that you undoubtedly have appendicitis and must be operated on immediately. If in addition he has no particular reputation as a diagnostician, and you discover that he never even graduated from a medical school you would not value his opinion, and you would most assuredly get another doctor. This story may serve to indicate some of the principles involved. The patient has a clear right to select his physician, to accept or reject the treatment. The editor or ornithological critic has not only a right but a duty to judge every sight record and his accepting one will be the result of exactly the same factors in principle, as the patient uses in trusting to a physician's diagnosis.

The scientific ornithologist must, therefore, ask himself an obvious question with regard to any sight record:—

What is the reputation of the observer for knowledge of the subject? This does not necessarily involve personal acquaintance with the observer. If he is known to be a trained field ornithologist the question is practically settled, the sight record will be accepted. If he has no reputation and is really entitled to one, he has only himself to blame. If he is not entitled to a reputation, it is his duty to pass satisfactorily on one or more of the following questions:—

(1) Is the observer thoroughly familiar with the birds of his locality? Was he aware of the importance of his observation?

(2) Did he ever see the bird before?

(3) Does he know the species with which it could be confused?

(4) Does his account show that the circumstances of the observation were thoroughly satisfactory?

(5) Did he recognize the bird at once, or did he have to look it up later?

Surely any fair-minded person could take no exception to the natural reasonableness of these questions. There is nothing harsh or hypercritical about them. It is equally obvious that as

more of them are satisfactorily answered, the value and probability of the identification steadily increase. It is also equally fair that if *none* of these questions is answered satisfactorily, the record should be rejected. As the ornithologist is responsible for the accuracy of what he publishes, it is *absolutely necessary* for him to reject any sight record of a bird known to be difficult to distinguish unless *every one* of these questions can be satisfactorily answered. And yet it is no exaggeration to state that the majority of records submitted for consideration do not afford the wretched editor a definite answer to a single one of these questions. Not only this, but an effort on the part of the editor to obtain answers to these questions frequently gives offense, and the written report of the observation frequently contains in itself an unfavorable answer to one or more of these questions. It is undoubtedly true that many valid observations are rejected annually, because the observer entirely fails to report them properly. His wrath at the editor could more appropriately be turned against himself. Again many bird-students have an idea that the record of the trained field ornithologist is readily accepted because his "word is good," and are annoyed that their "word is not good." This is absolutely incorrect. The record of the trained field ornithologist is almost invariably written up more carefully and more conscientiously than that of any other observer, he does not value "his word" at two cents, and the editor can answer every one of his questions favorably.

Failure to understand the reasonableness and justice of these questions which the editor asks himself, is proof positive that the mental attitude of the student is wrong, and that it is unscientific, which must always render his records liable to suspicion and subject to careful scrutiny. While on this subject I append in the form of little maxims, some other points founded on personal experience, which are indicative of an unscientific mental attitude. They do not apply to all bird students by any means, and are intended to be constructive rather than critical.

(1) Do not fail to recognize that the professional ornithologist knows more about the subject than you do.

(2) Do not tell a critic that you have studied birds for twenty-five years. You have not and he knows it. You have been interested in birds for twenty-five years, but you have studied them in a part of your spare time only.

(3) Do not try to argue yourself into a reputation as an expert. It is a matter of fact, not of argument. The professional must also be allowed some time to find it out. He has no psychic powers.

(4) Remember that the true ornithologist is pleased when another recruit joins the ranks. If he doubts your record, it is not because he is trying to down you, or to get rid of a dangerous rival.

(5) Unfavorable criticism, even if occasionally undeserved, is one of the best incentives to learning a subject well. The more you dislike it, the more likely you will be to take the steps necessary to make its repetition impossible. Merely getting hurt or sore will not help at all. If you are persistent, it will not discourage you. If you are not persistent, you cannot possibly become a trained field ornithologist anyhow.

The foregoing discussion has attempted to answer the question: "When is a sight record of scientific value?" If it is granted that the "human equation" is the chief difficulty involved, the fairness of the questions which the ornithologist, as editor or critic, asks himself about any given record, must also be granted. Of these it is obvious that the reputation of the observer for being a trained field ornithologist is the most important. If the bird student really wishes to make observations of scientific value, he must needs become a trained field ornithologist. Granted no physical defects and some aptitude for the study, this is well within the reach of anyone. Like every other art, it requires skill and knowledge, only to be attained by practice and study. This study should, of course, follow along definite lines, and I would suggest the following as necessary qualifications.

(1) First and most important, the student should learn *by heart* the published information on the birds of his locality. He should be able to give his "local list" from memory, and should know the status and seasonal occurrence of each species. This will teach him what to expect, and he will immediately recognize the abnormal or the unusual as such. If there be no published information, he should study the published information of all the territory adjacent to his.

(2) Next, commit the diagnostic characters of every species in the local list to memory. Get a mental image of what is to be

seen. Colored plates of practically every species of bird in North America are available to all. If possible, a museum should be visited and bird-skins examined. This is the best way of acquiring a clear mental picture.

(3) Next, get out in the field and learn to know the birds of your locality well. The length of time this will take is naturally a question of the amount of time available for field work, but ten years is a safe estimate. Most bird students waste a lot of time by starting to look for birds before they know anything about them, and as a result most of the first year or two is relatively profitless. It is perfectly possible to go south or west for the first time into a totally different avifauna, and recognize every species immediately.

(4) Above all, the student should cultivate the scientific attitude of mind, and he should never believe in his infallibility. The beginner's notebook is all question marks. The student who is beginning to know birds really well often has no question marks. The notebook of the trained ornithologist always has many question marks, until death closes the notebook.

The above constitute a minimum of requirements for a trained field ornithologist. Short of this his records must be examined most critically. To attain these qualifications calls for no special gifts or capabilities. The time required depends upon the time given. In fact, granted the goal, failure of attainment implies laziness and lack of interest. Some of the best field ornithologists this country has ever produced have been busy men absorbed in a totally different career, with whom ornithology has been purely a hobby.

Like any other study which is really worth while and productive of results, the genuine student will never be satisfied with the minimum. The pleasure of seeing a rare visitor or a total stranger in one's locality is increased if it can be recognized at once, it is doubly increased if it is an old acquaintance, seen previously somewhere else in its normal range. It is obvious therefore that an ever-increasing knowledge of North American birds and an ever-widening field experience can only add to the pleasure derived from the study as well as the scientific value of any given sight record. I do not want to close this paper on field ornithology, the subject which I love best in the world, on the harsh basis of

requirements and necessities. It is a trite aphorism that the enjoyment of a subject increases as our knowledge of it increases. So let us not think of requirements, but take the steps that will bring us the greatest possible enjoyment. One of the greatest advantages of field ornithology is that the more we know about it, the more we enjoy it, and the more we can benefit others. Its true student need never worry about criticism or incredulity.

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A CALENDAR OF BIRD MIGRATION.

BY NORMAN CRIDDLE.

In presenting the tables on bird migration given below a few explanations are necessary. To begin with, it must be realized that while all reasonable efforts have been made towards accuracy there are times when even the most careful observers fail to differentiate between closely allied species, and since collecting on a sufficiently wide scale is out of the question the determinations must be chiefly by sight. I believe there are very few errors in these records as a result of this method, but I wish to draw attention to the fact that very little attempt has been made to distinguish between geographical races excepting in a few cases when the habits of the birds involved can also be taken into account, but I have given the racial name when the evidence at hand indicates that it most probably applies to the bird reported. As an example all Meadowlarks, whether in song or not, are assumed to be *neglecta*, that being the dominant and probably the only race found in Manitoba, but the racial name must not be taken too literally.

These observations were made in the country at a place called Aweme in Manitoba, Lat. 49° 42′; Long. 99° 33′; they were commenced during the spring of 1895 and terminated in the fall of 1920, thus covering a period of 25 years. The country is semi-wooded but lacks surface water other than that supplied by the Assiniboine River some three miles away. The lack of water nea