

**BIRDS OF PASSAGE.**  
BY B. S. BOWDISH.

It is a far cry from the day when Aristotle propounded the doctrine that birds hibernate like woodchucks, to the present time, yet much of the mystery which that early naturalist sought to dispel still lingers about the wonderful phenomena of migratory movement.

Only in birds (unless we except fishes) is true migration instinct found. Erratic, semi-migratory movements of insects take place; scarcity of food or some other strongly compelling cause induces, from time to time, a semblance of migration among some of the mammals, but only the winged and feathered inhabitants of the globe exhibit a seasonal rhythmic swing from south to north and *vice versa*.

Our modern knowledge embraces much data respecting the actual migratory movement, its date of commencement, duration, and termination; the termini of the journey, the route followed, and the manner in which the traveling is performed. We have accumulated a great mass of statistics concerning the time in spring and fall when certain feathered wanderers may be reasonably expected to appear at a given point along their route. We know that the method of performing these journeys varies much between species, as in length of flight that takes them from winter to summer homes and return, whether they fly almost continuously or by short, leisurely stages; whether flights are mostly by day or night or both; the route followed, and whether this is changed by varying weather or other conditions. We also know that certain species perform their flight to their northern summer homes along one route, and return to their southern winter homes by a widely different course. It is well established that some species flock and fly almost entirely by themselves, that others are found widely scattered among flocks of other species, that in still other cases two or three species may almost certainly be found flocked together, while in some instances the flight is performed more in an individual and straggling manner. It is a fact well known to many gunners

winter, while in the wonderful breeding grounds along the coast of North Carolina, their numbers seem only to be limited by the persecution of the gunners. The northward journey of the members of this division, it is true, is for the most part, extended well into the Arctic or sub-Arctic regions, but this is largely a matter of necessity, to secure sufficient areas of suitable nature where they may breed in peace. Where birds of this division are not harrassed in late winter and spring by shooting, it has been found that they often remain in considerable numbers to breed, much further south than the usually ascribed southern limit of summer residence.

On the other hand, the migratory movement of the second division mentioned is one of the most extreme known. Such birds as the golden plover, black-bellied plover, buff-breasted sandpiper, and others of their kind are startling examples of the most wonderful migration flights. The golden plover, breeding within the Arctic Circle, often extends its quarters as far south as Patagonia. Of necessity the breeding season is short, but nearly six months is spent in winter homes. About four months of the year is spent in their spring and fall journeys, which are sometimes as much as 3,000 miles in length. In spring they travel northward *via* the Mississippi Valley, but in fall they go south by the way of Labrador and Nova Scotia, from the latter point launching out to sea, and in favorable weather often making a trip of 2,400 miles to South America without a known stop. There seems good reason to believe that this avoiding of our coast has increased in frequency since the shooting of the birds by the barrelful so reduced their numbers, and endangered a coastwise journey overmuch.

The black-bellied plover breeds equally far north and, on this hemisphere, winters in the West Indies, Brazil, and Colombia. The buff-breasted sandpiper summers as far north as the Arctic coast and winters south of Uruguay and Peru. Migratory movement in all such birds has been undoubtedly affected by changed coastal conditions and excessive shooting.

The third division represents birds that are practi-

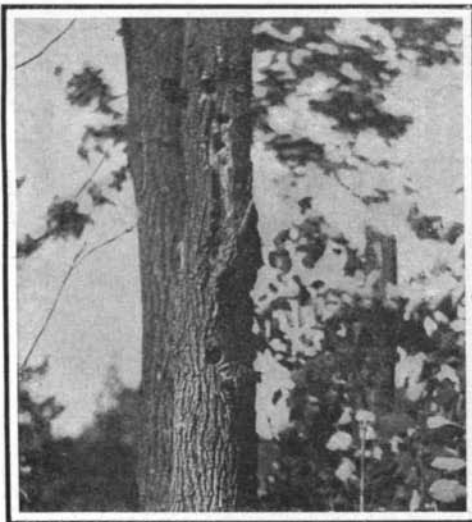


The osprey's nest to which the birds return year after year.

by birds in their journeyings north and south, has long been abandoned by the ornithologist. The question of food supply only offers partial solution. This is true of other tentative causes advanced. It seems probable that a number of causes in a great variety of combination contribute.

In the study of migration, one fact seems to be unmistakably established, namely, the existence of an instinct that enables birds in flocks or individually, to perform migratory flights of great length, and to return with great precision to the breeding spot of the previous year. Thus we find birds that breed gregariously, as gulls, terns, herons, and others, yearly returning to the same island, strip of beach, marsh, or swamp in a colony, and about the same time each year. In the same way our common birds that are more or less solitary in their nesting habits return in many instances to the same spot, year after year. The bridge girder, the beam in the cow-shed, or the molding on the porch pillar that has this year held a phoebe's nest, will, ten to one, hold such a nest next year. It is not exceptional to note on the limb of a village shade tree the occupied nest of the Baltimore oriole, the weathered last year's nest, and the battered remains of the nest of two years ago. A last year's nest of the vireo is often a good clue to the immediate whereabouts of an occupied nest. Robins' nests are not infrequently built on the remains of the domicile of the year before. A hawk's nest is often used for many years in succession, and this is particularly the case with the fish hawk or osprey, whose nests, thus added to year by year, often become very bulky, with the underpart or foundation a crumbling mass of age-decayed matter. Woodpeckers, who seldom use the same nest twice, often have two or more excavations in the same stub, the nesting cavities of successive years.

All this evidence of a return of individual birds to a given locality is, of course, not absolutely conclusive. It is seldom possible to adduce such conclusive evidence. The reasonable conclusion, however, must be that the weight of evidence is in favor of the theory  
(Continued on page 340.)



The downy woodpecker at home; a non-migratory bird.



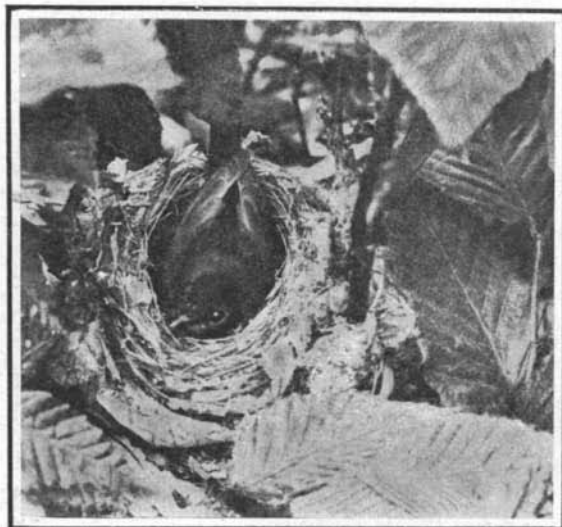
The nest of the Florida gullinule built for years in the same site, even after the marsh has become the center of a hustling city section.

that the course and manner of certain species of migrating birds has been changed materially within recent years, perhaps permanently, and that temporary changes of this character constantly occur, due to easily recognized causes. That class of birds whose life cycle is, perhaps, best known is naturally the one which includes those classed as game birds. Notably, as regards migration, these birds fall readily into three divisions: the water fowl, including ducks, geese, and swans; the Limicolæ or shore birds, principally the sandpipers and plovers; the gallinaceous birds such as the bob-white or quail and the ruffed grouse or partridge.

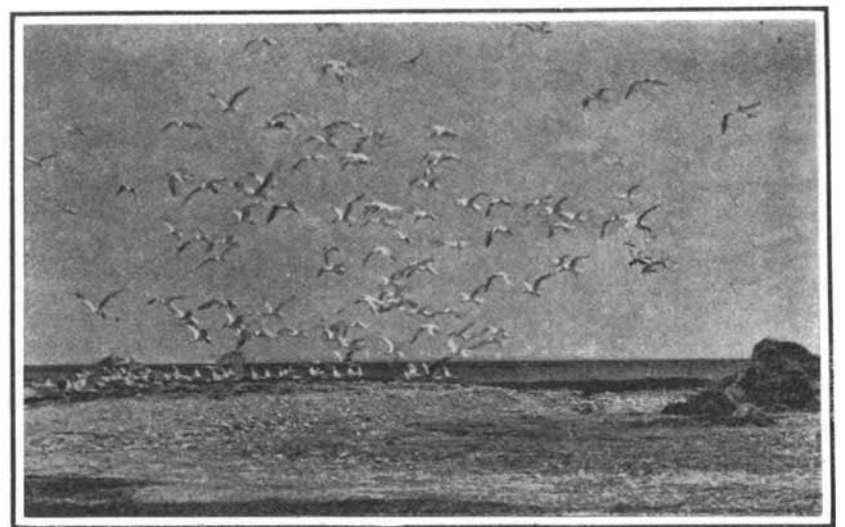
The southward fall migration of the first-mentioned division may, perhaps, be readily ascribed to search for wide and rich feeding areas, where open water is assured; the northern flight to a similar seeking of ample breeding grounds. While the southward flight is in some few instances continued as far as the West Indies and South America, in the main the movement is only sufficient and in general seems to conform to the cause assigned. In suitable localities on the New England coast and along Long Island we find an abundant representation of this division braving the rigors of

cally unaffected by migratory instinct. The bob-white and ruffed grouse are permanent residents where found, till adverse circumstances force them to leave, or extermination removes them from a locality.

The most fundamental factor in migration, the cause, remains practically unknown so far as birds in general are concerned. The formerly attributed cause, and the one which still figures largely in the popular mind, and seeking of a comparatively equitable climate



The hooded warbler and her home, close to last year's abode.



When the royal terns make their annual return to their island home.

and connected by compound positive clutches at both crank and main shafts, are fitted on the forecastle head for working the anchors.

The steam steering is of the Caldwell combined steam and hand type, with control shafting to the steering standard on the navigating bridge, and is placed in the engine-room casing. Hastie's hand-screw steering is fitted aft immediately over the rudder head, for use in case the steam gear breaks down. On the starboard side a motor launch is carried under Welin bow davits, ready for immediate use for taking soundings or making observations.

SOME CURIOSITIES OF INVENTION. (Concluded from page 332.)

by cork bulwarks b. We wonder if the inventor really believes in the efficacy of the hand-operated screw propeller which he has provided.

The Society for the Prevention of Cruelty to Animals would undoubtedly interest itself in restraining the inventor who devised the arrangement here shown to enable a dog or cat to run a sewing machine. We once heard of a man who patented a contrivance for driving a coffee mill by means of a bicycle, so that by the simple contrivance of riding a bicycle it was possible to obtain not only a certain amount of exhilarating exercise, but also to provide enough ground coffee for breakfast. This patentee surely outdoes him. The dog is made to rotate a central shaft carrying a large gear wheel which meshes with a small bevel gear carried on the sewing machine driving wheel. It seems to us that after the dog had sewed one shirt he would be too dizzy to do much more; or perhaps when that occurs, the central shaft is to be driven in the opposite direction.

A grain of common sense is to be found in the trunk that becomes its own luggage trolley, for it must be confessed that the ordinary trunk when full is not the easiest thing in the world to handle. The inventor has provided a single wheel and a folding lever handle which serves the purpose of pushing the wheeled trunk along. He evidently was not concerned much with the problem of the amount of space consumed by the wheels and the handle when folded within the trunk.

The handle shown for carrying parcels used in carriages has been employed in European railways. The device consists simply of two straps and a rest board, with the whole easily detachable. Straps serve the purpose of binding the rest board and walking sticks and umbrellas together.

A boat driven by windmills is certainly a mechanical curiosity. Just why this complicated arrangement of bevel gears connecting the propeller shaft with the vertical windmill shaft should be better than canvas transcends our imagination.

There is a touch of the Yankee in the fishing device, the last of the inventions illustrated. Evidently the inventor was accustomed to fishing in streams where bites were few and far between, and where patience was ill rewarded. He has contrived a fishing pole with a swinging arm carrying a clapper which is made to ring a bell as soon as a fish bites and swings the arm down.

BIRDS OF PASSAGE.

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of the return of the same individuals. Some wonderful European records of the return of a species to a given nesting site are given by the late Prof. Alfred Newton. A common falcon, Falco peregrinus, a cosmopolitan bird commonly known as the duck hawk, in this country, had its eyrie at one point in Finland for 110 years; that is to say, there was at this same point an occupied nest of this species from 1736 to 1855. At Oxbridge, in one or the other of two earthen bottles placed for their use, a pair of blue titmice had their nest every year, with two (Concluded on page 342.)

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(Concluded from page 340.)

exceptions, from 1779 or 1785 to 1873, or a total of 88 to 94 years. While it might be possible that by coincidence the individuality of this continuous tenantry would continually vary, yet it is hardly possible that it was other than a case of a family castle handed down to posterity.

A fact which is incidentally brought out by these observations on the return of birds to a given locality, is the apparently passionate fondness for a given nesting site, regardless of changing conditions in connection with it. In illustration of this the author just quoted cites the case of a stone-curlew, *Edicnemus crepitans*, a bird frequenting open places almost exclusively. For many years a pair of these birds had a nest at a certain spot near Elwedon, Suffolk, England, and during this period the environment underwent a complete change, from a barren rabbit warren to a flourishing plantation, in the center of which the nest continued to be occupied. An even more remarkable example of fondness for a certain spot, regardless of change of conditions, was brought to the attention of the present writer several years ago. A portion of Long Island City, within the greater city of New York, was being built up on filled-in marsh. During the fall and winter a plot of ground was filled-in and a house built thereon. The following spring a Florida gallinule, *Gallinula galeata*, was repeatedly observed wandering disconsolately back and forth across the dooryard, seeking the site of last year's nest, though all about were patches of virgin marsh.

It seems quite possible that this fondness for a breeding home, once established, may be an important factor in the causes of migration.

Here, then are some of the facts that command attention, in the results of the data that has been accumulated regarding migration; the impulse to migrate, for which we have no adequate and demonstrable explanation; the stability to steer a course with such remarkable accuracy over areas where landmarks are wanting, and in the night and storm when they are obliterated, demonstrating a most highly developed sense of direction, which is but imperfectly present in the wildest races of mankind, and usually almost or entirely wanting in civilized man; the adoption of certain well-defined migration routes, both in the Western and Eastern hemispheres, which may be varied from spring to fall, or become changed by untoward conditions; the existence of this migratory instinct in varying intensity, which coupled with conditions of food supply and breeding sites induces in some species immensely extended journeys, from which there is every gradation to the species which are apparently immune to the promptings of this instinct. In connection with this last fact it should be borne in mind that the fact of a species being found in a given locality throughout the year does not necessarily imply that the individuals of that species are not migratory. The individuals found in a locality in winter may have summered further north, and coming to that locality in fall, overlapped the departing summer birds, so that at no time individuals of the species were wanting, though not at all times the same individuals.

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