

States. Their migration is consequently due to a large extent to the maturing of the weed seeds, and they move southward only so fast as they devour their favorite seeds in each section. Fortunately, different species of birds choose different kinds of seeds as their favorite food, and very few weeds escape.

Thus the blackbirds make their first raid upon the seeds of the common smartweed or bindweed, and the field sparrows select the seeds of crab grass. Nuttall's sparrow shows a particular penchant for the seeds of the wild amaranth and lamb's-quarters. Tree sparrows are found most frequently hunting seeds of pigeon grass, while the obnoxious pigweed attracts the snowflakes and goldfinches. It is becoming evident to the students of birds that they are influenced almost solely in their migratory habits by the harvest of weed seeds, and not by the climate. We have always supposed that the birds started southward as soon as the chill of autumn approached, but cold, frosty weather might come in August, and the birds would not begin to migrate. They are not weather prophets at all, but simply hungry little creatures following in the footsteps of ripening seeds.

It is quite evident to bird students that many of our birds could be induced to stay North all winter if they could be supplied with an abundance of choice seeds. Some seasons they linger with us so late in the season that wonder is expressed by the casual observer, but the reason for it is that the seeds of some choice weeds have been late in ripening, or the birds have found an unexpected harvest of them in the vicinity. As a visible proof of this constant relationship existing between the migration of birds and the supply of food, it is only necessary to refer to the fact that more birds, and a greater variety, winter in our city parks than can be found in the cold, bleak woods or fields. It has been supposed that these birds have been induced to stay with us because of the greater or less protection they receive in the heart of a city from the cold weather; but the chief reason of their sojourn in the North through the winter is the greater abundance of food found in the city parks. In a thousand ways food is supplied to them in the parks which they could not get in the wild woods and fields. In most of our parks the visitors and school children feed the birds and squirrels, and in late years the department of parks has essayed to supply the winter birds with all the food they could eat. As a direct result of this policy the winter bird inhabitants of our city parks are steadily increasing.

In the new study of bird life, it is becoming evident to those most interested in the subject that it is possible to make our winter birds more numerous by simply feeding them and providing them with winter protection. Bird houses should be more generally constructed. These should be built for the purpose of sheltering the birds from cold snowstorms and wintry winds and rain. They should be built with the north and west side made wind and rain-proof, and the south and east sides with openings and wide verandas where the birds can sun themselves and dry their plumage after a rain. There should be an inner and outward compartment, where the birds can retire in very cold weather. The inner compartment should be supplied with plenty of soft cotton, hay, and woolen rags. To reach the inner compartment it should be necessary for the birds to pass through the first, and then down a long passage to a door which opens at the opposite end. In this way the bird house is made suitable for all weather. The walls of the inner compartment should be made double, with felt lining between them. Then in the coldest weather, our most sensitive birds can find ample protection from snow and wind. To introduce them to their new winter quarters, choice seeds and food should be scattered all through the house, and they will gradually follow this, and become enamored of their new home. The cost of constructing such a bird house for winter habitation need be very little. The outside architectural features will of course increase the expense to any sum one may wish to put in the house. With thousands of these built all over the country, our winter population of plumage, and even song birds, would rapidly increase.

There is one feature of bird migration which scientists have made special studies of in the last few years, and which is intimately associated with the food question. It was supposed formerly that migrating birds traveled very rapidly, some covering the distance between the Southern and Northern States in an incredibly short time. Some were even said to fly at the rate of fifty and sixty miles an hour, and to keep this up for eight and ten hours a day, as if anxious to get back to their winter or summer haunts. The very contrary has been found to be the case. The migration journey is a period of harvest-time joy and celebration for the birds, and they are happy and joyful throughout. It is a period of feasting, of gluttony, and oftentimes of song. The birds move slowly, if the food is abundant, lingering in one place for days and weeks where the harvest is particularly good. Instead of traveling rapidly in their great migration,

they frequently, in the autumn of the year, move only at the rate of a few miles a day, and not infrequently only a few miles a week. They pass over barren and unproductive places with considerable swiftness, flying in large flocks to some better feeding ground. Observations of their flight at such points may naturally have led some to infer that they move rapidly north and south.

In the northward journey in the spring, they move on an average much faster than in the autumn, for it is then the desire for nesting that urges them onward, while the supply of food is much more limited. The insectivorous birds are most inclined to linger in the newly-plowed fields, but the typical seed-eating birds hurry to their favorite haunts to build their spring home. In selecting this, the food question influences every couple. Scatter daily plenty of food in an orchard, and year by year the number of birds nesting there will increase. This food should be spread out very early in spring, so that the earliest comers will find it. This will encourage them to return earlier another season. G. E. W.

THE DEATH OF JEREMIAH M. ALLEN.

On December 29, Mr. Jeremiah M. Allen, known to every engineer in the United States as the president of the Hartford Steam Boiler Inspection and Insurance Company, died at his home in Hartford, Conn. For thirty-three years he had been president of the company, during which time he had devoted himself with untiring energy to his chosen work.

Mr. Allen was born on May 18, 1833, in Enfield, Conn. Hartford will ever remember him as the first president of her board of trade, organized in 1888, and also for the work which he did while a member and president of the board of trustees of the Hartford Theological Seminary. There is hardly an institution, financial or industrial, of the city of Hartford with which he had not been directly or indirectly connected. Mr. Allen was a member of many scientific societies, among them the American Society of Mechanical Engineers, American Society of Naval Engineers, the American Association for the Advancement of Science, the American Historical Society, and the Connecticut Historical Society.

Mr. Allen for a number of years had been a lecturer on insurance topics at Sibley College, Cornell University, and at the Worcester Polytechnic Institute. This year he was to deliver a course of lectures at Yale.

Mr. Allen was a descendant of Samuel Allen, who settled in Cambridge, Mass., in 1632, and who was an ancestor of Ethan Allen, of Revolutionary fame. The history of the Allen family has been the history of men who have had a bent for mechanics and science. One of the earlier Allens was the first man in the country to make telescopes and microscopes; another was an astronomer.

As a business man Mr. Allen's abilities were amply shown in the wonderful development of the Hartford Steam Boiler Inspection and Insurance Company under his presidency. Its capital increased to over two and a half million dollars. He started a magazine called the "Locomotive," which treats in a bright and entertaining way engineering topics of interest to insurance engineers.

THE NEW BRITISH SHIPBUILDING PROGRAMME.

BY H. C. FIFE.

The British Admiralty have just published the particulars of the new warships which are to be laid down early in the present year. These vessels were provided for in the estimates 1903-1904; but the designs have only just been published.

Three Battleships, "King Edward VII." Class.			
Name.	Displacement, Tons.	I. H. P.	Speed, Knots.
"Britannia"	16,350	18,000	18½
"Africa"			
"Hibernia"			
Four Cruisers, "Duke of Edinburgh" Class.			
"Warrior"	13,550	23,500	22½
"Natal"			
"Cochran"			
"Achilles"			
Four Scouts, 25 Knots.			
"Skirmisher"	2,900	17,000	
"Foresight"	2,545	16,000	
"Attentive"	2,750	16,000	
"Patrol"	2,610	16,000	
Fifteen Torpedo-boat Destroyers.			
Length, 220 feet; beam, 20½ feet; speed, 25½ knots.			
Ten Submarines. To be built by Vickers' Sons & Maxim.			

The three new battleships are to be built in the royal dockyards. They are to be named "Hibernia," "Britannia," and "Africa." They will resemble in most details the five battleships of the "King Edward VII." class now under construction, viz., "King Edward VII.," "Commonwealth," "Dominion," "Hindustan," and "New Zealand." They will carry four 12-inch and four 9.2-inch guns in six turrets; ten 6-inch rapid-fire guns in battery; forty smaller guns; four submerged torpedo tubes. The three new battleships will, however, be an improvement on the "King Edward" in certain particulars.

The four new first-class armored cruisers will be of the "Duke of Edinburgh" class, including the two vessels "Duke of Edinburgh" and "Black Prince." They

will carry six 9.2-inch, 50 caliber guns in turrets, and ten 6-inch rapid-fire guns in battery, besides twenty-eight smaller rapid-firers.

The four "Scouts" are all of different design, the preparation of the plans having been left to the builders. They are all bigger and more powerful vessels than the four previous "Scouts" now building, viz., "Sentinel," "Forward," "Adventure," and "Pathfinder," whose displacement is 1,600 tons, and armament consists of ten 3-inch guns.

The fifteen torpedo-boat destroyers are to be stronger vessels than the 30-knot type.

SCIENCE NOTES.

It is stated that a mixture of salol and antipyrine is employed to give a fictitious melting point of 20 deg. C. to oil of geranium; and that the mixture is largely used to sophisticate otto of rose.—Jour. Pharm. d'Anvers.

Maryland has now the best magnetic survey of any country except Holland, and it needs it, since Washington is near a very pronounced disturbance. The magnetic survey of the United States is being reorganized, and by 1910, it is planned, there will be one magnetic station to every 25 or 30 square miles; at present Holland has one to every 40 square miles, and England one to every 139 square miles. Canada, it is hoped, will join in this, as in the other meteorological work of the United States. Five magnetic observatories are contemplated.

Dr. Bauer, of the United States Coast and Geodetic Survey, has calculated the earth's magnetic energy. Calculating the total energy of the magnetic field outside the earth's surface in spherical harmonics, Dr. Bauer finds that there has been a loss of three per cent in the total energy between the years 1838 and 1884. That would indicate that the earth's magnetism is dying out. But the results are too uncertain. It is curious that we should be more certain about the earth's potential of fifty years ago than about the present potential.

Colors of Autumn Leaves.—The bright colors assumed by maple, sumacs, and ampelopsis during the autumn months are the result of the oxidizing of the color compounds, or color generators, of the leaf cells. Long-protracted cool weather is most favorable to the production of autumn tints, and slight frosts that are not severe enough to kill the cells hasten the display of beauty by producing an enzyme that brings forth the bright purples, oranges, and reds. Leaves containing much tannic acid never give bright autumn tints, while those containing sugar give the very prettiest.

In the course of some digging operations in a garden at Haslemere, Surrey, England, a gardener unearthed a number of ancient vessels of peculiar shape, together with a quantity of calcined human bones, at a depth of about two feet below the surface. The British Museum authorities who have examined the discovery pronounce the vessels to belong to the late Celtic (early iron) age, about B. C. 150. E. W. Swanton, the conservator of Dr. Jonathan Hutchinson's Educational Museum, carefully examined the fragments, and only three or four vessels were found in a perfect condition. He computed that twenty-two urns and pots were originally interred at the spot.

Dr. Charles H. Herty, an expert on the subject of forestry and an *attaché* of the United States Bureau of Forestry, is the inventor of a new method of gathering turpentine which will revolutionize the methods now in vogue, and be the means of saving an immense amount of money to the South, where the turpentine industry thrives. Heretofore the crude turpentine has been gathered by cutting a kind of "box" or pocket in the base of the tree, and into this the product found its way from the scarified sides of the tree. The method was not only wasteful, but also damaged the tree to such an extent that its life of usefulness was considerably shortened. It is said that two million acres of virgin forest are "boxed" annually in this way. Dr. Herty is a Southerner, and foreseeing the eventual ruin of a great industry, set about to arrive at some other means of extracting the resin, which he has succeeded in doing in a manner which meets all the demands of the case and increases the production by about seventy-five per cent, by the recovery of that which was formerly wasted and the improved quality of that gathered. The apparatus made use of by Dr. Herty is simple and inexpensive, consisting as it does of an earthenware cup with a nail hole near the top, a six-penny wire nail to hold it in place, and a pair of galvanized iron troughs to divert the flow of resin into the cup. Dr. Herty has not attempted to enrich himself by a monopoly of what is a patentable article, but has announced that the use of the process is public property. As the turpentine industry of the South is a very important one, this gift represents a money valuation of considerable size.