HOME OF THE AMERICAN OSPREY.

BY DANIEL C. BEARD.

Within half a day's journey of New York city lies an almost desert island, whose barren wildness is interrupted—marred, I had almost said—only by a single habitation. A stone lighthouse perched upon the bluff at the end of the island seems a natural accessory to this lonesome symphony of rock, sand, water, and sky. The inhospitable coast of this island offers no safe port or harbor, but the treacherous sandy beach is ragged and broken with huge bowlders and rocks, against whose flinty sides the angry impetus of the storm wave is dashed and splintered into foam and spray. The occasional fragments of wrecks strewn upon the beach, or forming appropriate monuments to the graves of drowned mariners, testify to the danger of the coast, and add a solemn tone to the sea-song of this desert isle. A marsh or swamp occupies the center of the island, about which grow trees of some height, being in a measure protected from the winds by the surrounding hills or mounds, whose sandy baldness is scarcely covered by a thin growth of wiry grass. At the foot of the hills, stretching to the water's edge, are sandy flats, dotted here and there with trees, gnarled, knotted, misshapen, and dwarfed by exposure to tempest and lack of nourishing soil.

Each summer's vacation, as our yacht has passed this island, my curiosity has been excited by the great number of birds which make it their home. It was partly to satisfy this curiosity, and partly to try the black fishing, which is excellent in the dangerous eddies of the tide, that induced the writer, with two companions, to land upon this island one quiet Sunday morning. As our little sail boat approached the lighthouse we saw a couple of great northern divers swimming unconcernedly about, or ever and anon disappearing beneath the smooth waters. After landing, we walked over the sandy flats, disturbing by our footsteps scores of night-hawks (*Chordeiles popetue*). These mysterious birds filled the air overhead, and darted down past our ears with a loud whirring noise, while they all kept up a constant repetition of their peculiar cry. Numerous as these birds were we only succeeded in finding one egg. Nests they have none; but so closely does the egg resemble the lichens, dry grass, or moss, that although the mother bird may rise from beneath your feet, it will require a careful search and a sharp eye to detect the little roundish-shaped eggs.

In the low bushes or high grass along the edges of the swamp, we found numerous nests of the swamp blackbird (*Agelaius phœniceus*). Some meadow larks had their nests upon the grass plat in front of the lighthouse door, on top of the bluff. The sandy face of the bluff was perforated with innumerable burrows of the industrious bank swallow (*Cotyle riparia*).

On any part of the island, turn whichever way we would, the large nest of the fish-hawk formed a prominent feature of the landscape, and from sunrise to sunset the American osprey sailed around overhead in graceful curves, protesting with shrill cries against the invasion of their territory by strangers.

Baird says that the American osprey or fish-hawk nests almost invariably in the tops of tall trees. He gives as exceptions to this rule a nest upon a small pine tree in Maine, and one upon a cliff upon the Hudson River. Audubon, I believe, found two fish hawks' nests upon the ground.

With these facts in my mind, I was somewhat surprised to find ospreys' nests scattered around promiscuously upon the sand dunes, piles of driftwood, tops of bowlders and small trees. The nests are all of them rather nicely built, the foundation consisting of quite large sticks, and in some instances pieces of plank weighing fully as much or more than the bird; over this foundation a layer, composed of seaweeds, sponges, and other odd material cast up by the waves, the nest itself being a shallow dish-like hollow, of fine soft seaweeds and grasses. Those I found upon the ground stood about two feet high, but some of them in the trees would measure, from foundation stick to summit, fully five feet. Such nests are eagerly seized upon by the purple grakle or crow blackbird (*Quiscalus purpureus*), and all the interstices between the sticks forming the hawks' nests are often filled with the nests of blackbirds. I counted six blackbirds' nests in the portion of an osprey's nest within sight; there were three eggs in the hawk's nest, and most of the blackbirds' nests contained young birds just out of the egg. Some ospreys' eggs that I took from a nest in a tree were prettily marked with dark purplish or wine-colored markings upon a cream-white ground. I noticed, however, that in four or five different nests upon the ground the eggs were all a dirty-brown color, harmonizing so perfectly with the dry seaweed lining of the nest as to require a quick eye to detect the egg in the nest when the observer stands only a few feet away.

After making some sketches, collecting some eggs, and catching about sixty pounds of blackfish, our party bade farewell to the island, and were rowed out to a passing steamer, which slowed up and took us aboard. A few hours after we were back in the hot dusty streets of the great metropolis, with only our sun-burnt faces to remind us of the island-home of the American osprey.

HOME OF THE AMERICAN OSPREY.

A Sitting Snake.

One of the Indian pythons (*Python molurus*) in the Zoological Society's reptile house, which has been until lately in company with a male of the same species, deposited a quantity of eggs last week, and immediately commenced the duty of incubation, which, as it would now appear, is as carefully performed in these highly-organized reptiles as in the case of the superior class of birds. The "pythoness" is an excellent mother, and has not deserted her post day or night up to the present time. The eggs, which are believed to be about twenty in number, are completely covered by her coils, and the mother herself by her blanket, so that she cannot be seen by the casual spectator. In 1862 a large West African python in the Zoological's Society's collection laid a quantity of eggs, and sat on them nearly ten weeks, after which, as there appeared to be no reasonable prospect of her hatching the eggs, they were removed. But upon subsequent examination several of the eggs were found to have the embryo partly developed. It is hoped, therefore, that a successful result may be obtained on the present occasion.—*London Times.*

Temperature of Least Resistance in Steel.

It is well known that a steel that is very flexible when cold breaks at the blue annealing temperature. It has generally been considered that the purer the iron is the less subject it becomes to this defect, but the workmen of the Ural Mountains, who use irons of remarkable purity, have often observed the same fact. Mr. Adamson has found that the metal becomes powdery at a temperature between 260° and 370° C. (500° and 698° Fah.), or the temperature at which willow twigs take fire.

This phenomenon seems to explain a large number of accidents, as, for example, the breaking of tires under the action of brakes and the fracture of riveted moulds and of machine arbors which become heated by friction.—*Ann. du Gen. Civ.*

THE Holly Manufacturing Company, of Lockport, N. Y., has opened a special office at 157 Broadway, under the charge of Mr. C. G. Hildreth, secretary of the company.

Curious Observations on Ants.

Sir John Lubbock lately read a paper on the subject at a meeting of the Linnæan Society. He said that in one of his former papers (Linnæan Society *Journal*, vol. xiv., p. 278) he had given a series of experiments made on ants with light of different colors, in order if possible to determine whether ants had the power of distinguishing colors. For this purpose he utilized the dread which ants, when in their nest, have of light. Not unnaturally, if a nest is uncovered, they think they are being attacked, and hasten to carry their young away to a darker, and, as they suppose, a safer place. He satisfied himself, by hundreds of experiments, that if he exposed to light the greater part of a nest, but left any part of it covered over, the young would certainly be conveyed to the dark portion. In this manner he satisfied himself that the different rays of the spectrum act on them in a different manner from that in which they affect us; for instance, that ants are specially sensitive to the violet rays. But he was anxious to go beyond this, and to attempt to determine how far their limits of vision agree with ours. We all know that if a ray of white light is passed through a prism, it is broken up into a beautiful band of colors—the spectrum. To our eyes it is bounded by red at the one end and violet at the other, the edge being sharply marked at the red end, but less abruptly at the violet. But a ray of light contains besides the rays visible to our eyes others which are called, though not with absolute correctness, heat rays and chemical rays. These, so far from being bounded by the limits of our vision, extend far beyond it, the heat rays at the red, the chemical rays at the violet end. He wished under these circumstances to determine if possible whether the limit of vision in the case of ants was the same as with us. This interesting problem he endeavored to solve as follows: If an ants' nest be disturbed the ants soon carry their grubs and chrysalises underground again to a place of safety. Sir John, availing himself of this habit, placed some ants with larvæ and pupæ between two plates of glass about one-eighth of an inch apart, a distance which leaves just room enough for the ants to move about freely. He found that if he covered over part of the glass with any opaque substance, the young were always carried into the part thus darkened. He then tried placing over the nest different colored glasses, and found that if he placed side by side a pale yellow glass and one of deep violet, the young were always carried under the former, showing that though the light yellow was much more transparent to our eyes, it was, on the contrary, much less so to the ants. So far he had gone in experiments already recorded; but he now wished, as already mentioned, to go further, and test the effect upon them of the ultra violet rays, which to us are invisible. For this purpose, among other experiments, he used sulphate of quinine and bisulphide of carbon, both of which transmit all the visible rays; and are therefore perfectly colorless and transparent to us, but which completely stop the ultra violet rays. Over a part of one of his nests he placed flat-sided bottles containing the above-mentioned fluids, and over another part a piece of dark violet glass; in every case the larvæ were carried under the transparent liquids, and not under the violet glass. Again, he threw a spectrum into a similar nest, and found that if the ants had to choose between placing their young in the ultra violet rays or in the red, they preferred the latter. He infers, therefore, that the ants perceive the ultra violet rays, which to our eyes are quite invisible.

Now as every ray of homogeneous light which we can perceive at all appears to us as a distinct color, it seems probable that these ultra violet rays must make themselves apparent to the ants as a distinct and separate color (of which we can form no idea), but as unlike the rest as red is from yellow or green from violet. The question also arises whether white light to these insects would differ from our white light in containing this additional color. At any rate, as few of the colors in nature are pure colors, but almost all arise from the combination of rays of different wave lengths, and as in such cases the visible resultant would be composed not only of the rays which we see, but of these and the ultra violet, it would appear that the colors of objects and the general aspect of nature must present to them a very different appearance from what it does to us. Similar experiments which Sir John also made with some of the lower crustacea point to the same conclusion, but the account of these he reserved for a future occasion. He then proceeded to describe some experiments made on the sense of direction possessed by ants, but it would not be easy to make these intelligible without figures. After detailing some further experiments on the power of recognizing friends, he gave some facts which appear to show that ants, by selection of food, can produce either a queen or a worker at will from a given egg. Lastly, he stated that he had still some ants which he had commenced to observe in 1874, and which are still living and in perfect health: they now, therefore, must be more than seven years old, being therefore by far the oldest insects on record.

Naval Brass.

In the early part of 1874, in consequence of numerous cases of failure in respect to Muntz metal in ships of the Royal Navy, the attention of the Admiralty was drawn to the subject, and they directed inquiry to be made as to the cause of these failures. Mr. Farquharson, to whom the matter was referred, found that the causes of decay which had been suggested would not account for that which actually took place. In the numerous cases which came under his notice, two conditions of use were always observable, namely, salt water and contact with an electro-negative metal—a fact which pointed strongly to electro-chemical action as the cause of the change. On the other hand there was a total absence of surface-pitting. To the eye the surface of the affected bolts was as smooth and perfect as when they were first made. It was difficult to understand how an internal change, such as actually took place, could come to pass in the way inferred. Fortunately a very simple expedient proved beyond doubt that salt water had penetrated an apparently sound and close metal, and the mystery was thus dispelled. Bolts 3½ inches in diameter, whichhad been used for securing propeller blades, were shown to have been thus penetrated to the center. In view of these facts, the conclusion that a portion of the zinc had been dissolved out was inevitable, and this explanation has been thoroughly verified by comparing analyses of affected and unaffected parts of the same bolts.

The circumstance that no such change as that to which we now refer was to be found in any of the numerous varieties of gun metal, rendered it probable that it was peculiar to alloys of copper and zinc, so that if a forgeable metal could be produced with tin in its composition, having the requisite strength and ductility, the alloy thus formed would be free from the defect complained of. In the latter part of the year 1874 an alloy, composed of 62 parts of copper, 37 of spelter, and 1 of tin, was proposed by Mr. Farquharson, as possessing the requisite mechanical properties. The Admiralty thereupon referred the question as to the endurance of such metal to Dr. Percy, of the Royal School of Mines, in conjunction with Mr. Farquharson. These parties, after subjecting an alloy of this description to severe tests, under which the Muntz metal completely failed, reported to the Admiralty in 1879 that the new compound had stood the test satisfactorily. Accordingly it was adopted as the service alloy under the title of "naval brass." The process of manufacture is the same as for yellow or Muntz metal. To insure the best results, Australian or English B.S. copper should be used, and the proportions of metal stated above closely adhered to, due allowance being made for the loss of zinc in the process of melting. When finished cold, and left unannealed in rods and sheets of moderate thickness, the metal has a tensile strength of from 67,000 pounds to 72,000 pounds per square inch, according to the amount of rolling it has received. Bolts of any size can be made of it, the usual practice being to take a rod the size of the bolt required, and to form the head by upsetting in a die. This is done without stress or injury to the metal in a bolt or rivet-making machine, with heads two diameters of the bolt.

The new alloy is specified for all ships built for the Admiralty, and the details now given may be of service to contractors and others using naval brass. The metal, not being fusible until above a red heat, gives promise of being valuable as linings to main brasses of engines and for other purposes where white metal is now used, and we understand that arrangments are in progress for testing its value under such conditions. The result will be awaited with interest by many who have experienced the need of a good bearing metal.—*The Engineer.*

Heating Effects due to Compression.

On two former occasions we have taken notice of the results of certain experimental investigations instituted by Professor P. G. Tait, of the University of Edinburgh, in regard to the thermometers used in the Challenger expedition, and the alleged effects of compression upon them when immersed to great depths in the sea. Still pursuing the line of inquiry suggested by the experiments made with these thermometers, the learned professor has since made a further series of experiments on the heating effects of compression of a number of liquids and semi-solid liquids, the results of which he laid before the Royal Society of Edinburgh on the evening of Monday, May 16. He mentioned that he had employed a ton pressure upon each of a number of different substances, and had noticed in each case the rise of temperature due to the compression exerted. Marine glue gave a rise of temperature to the extent of 0·9° Fah.; raw potato, 0·7°; pith, 0·37°; cork, 1·3°; a piece of bar soap, about one-twentieth of a degree; a piece of licorice and a piece of cheese, about three-quarters of a degree; a piece of raw flesh behaved very much like the potato; India-rubber and solid paraffine rose in temperature about 1½°; lithographer's ink and shoemaker's and bees' wax, about 1·4°; lard, about 2°.

After mentioning these details, Professor Tait said it was remarkable that potato and raw flesh, with so large a percentage composition of water, had a large comparative amount of independent heat produced, while pith gave no perceptible difference of effect over what would have been produced by water alone. Cork had this peculiarity, namely, that when the pressure was removed the fall of heat was only 0·9° Fah., as against 1·3° of a rise on the application of the same amount of pressure. That seemed to agree, he said, with what was already known of cork, namely, that on the removal of the pressure it did not spring back to its original form. In these respects India-rubber was opposed to cork, which had this further peculiarity, that, on continued experiment, the amount of heat produced by the pressure gradually fell till it was the same as the amount of cooling which resulted on the relaxation of the pressure. About shoemaker's wax there was the peculiarity that it took a very long time before the heating effect was fully produced. Its chemical composition, also, was of course different from that of beeswax, which yet had precisely the same amount of heat produced. In concluding his interesting communication, Professor Tait intimated that further research would be necessary before they could get definite facts showing the exact heating effects of compression, which, he added, would form the subject of a future communication.—*Engineering.*

The Curse of Poor Printing.

Short-sightedness, or myopy, is increasing to an alarming extent among civilized nations. It is commonly supposed that only a few persons are thus afflicted, but the truth is that a large portion of every community is more or less troubled with imperfect vision. Myopy among school children and attendants at higher institutions of learning in this and other countries has been thoroughly investigated by Prof. Hermann Cohn and a number of other eminent oculists, who have examined in all more than forty thousand scholars. The facts they have gathered deserve the most serious consideration.

The general conclusions arrived at by all the investigators have been formulated by Prof. Cohn, as follows: "1. Short-sightedness hardly exists in the village schools—the number of cases increases steadily with the increasing demands which the schools make upon the eyes and reaches the highest point in the gymnasia. 2. The number of short-sighted scholars rises regularly from the lowest to the highest classes in all institutions. 3. The average degree of myopy increases from class to class—that is, the short-sighted become more so." It was found that in the village schools scarcely one per cent, in the elementary schools five to eleven per cent, in the girls' schools ten to twenty four per cent, in the real schools twenty to forty per cent, and in the gymnasia between thirty and fifty-five per cent of the pupils are myopic. In the prima of several German gymnasia more than sixty per cent of the students are myopic, at Erlanger eighty per cent, and at Heidelberg not less than one hundred per cent. Examination of university students has so far been made only at Breslau and Tübingen, where, in 1867, Prof. Cohn found that fifty-three per cent among the Catholic theologues were short-sighted, fifty-four per cent of the law students, fifty-six per cent of the medical students, sixty-seven per cent of the evangelical theologues, and sixty-eight per cent of the students of philosophy. Some nationalities are much more troubled by the affection than others. For instance, in New York twenty-seven per cent, and in Boston twenty-eight per cent of the pupils in the gymnasia were found to be myopic, while at Tiflis thirty per cent of the Russians, thirty-eight per cent of the Armenians, and forty-five per cent of the Georgians were near-sighted.

Prof. Cohn cites among the principal causes of myopy, badly constructed school benches, bad writing, and bad type. The latter evil he says deserves especial attention, and for remedying it he makes some valuable suggestions, of which the following are the most important:

"The most important point is the size of the letters. We cannot determine this by the measurement of the em, as the printers do, for that regards the shank of the type, of which readers know nothing; but it must be judged by a special measurement of the visible letter. I have adopted as the standard of measurement the letter n, that being the most regular and symmetrical in shape in both the Roman and German alphabets. I have found that the n in pearl type is about three one-hundredths of an inch high, in nonpareil about one twenty-fifth of an inch, in brevier about one-twentieth of an inch, in long primer one-seventeenth inch, and in pica one-fourteenth inch. We have hitherto had no definite rule concerning the smallest size of letters which should be permitted for the sake of the eyes. The distance at which a letter of any particular size can be seen does not afford a guide to it, for it does not correspond at all with the distance at which matter printed in the same type can be read steadily at the usual distance in reading. I believe that letters which are less than a millimeter and a half (one-seventeenth inch) high will finally prove injurious to the eye. How little attention has hitherto been paid to this important subject is exemplified in the fact that even oculistic journals and books frequently contain nonpareil, or letters only a millimeter (one twenty-fifth inch) high. Many of the text books required by the school authorities are badly printed. The officers should go through every school book with a millimeter rule in their hands, and throw out all in which the letters are less than a millimeter and a half high, and should give the preference to those establishments which do not use letters of less than two millimeters (one-thirteenth inch). The distance between the lines is an important factor in respect to ease in reading. As is well known, the compositors often insert thin leads between the lines so that the letters which project above the average height and those that fall below the line shall not touch. Every one knows that legibility is improved by contrast; the darker the print and the clearer the paper, so much easier is the reading. When the lines are close together, or the matter is printed 'solid,' the eyes become tired sooner, because the contrast is lessened. The lines tend to run together, and the effort to separate them strains the eyes. In fine editions the lines are widely separated. I consider a book well leaded in which the interlinear space, measured by the shorter letters, amounts to three millimeters (one-eighth inch). The lines will really seem to be closer, for the projections of the longer letters will encroach upon the interlinear space; and cases may occur, where those letters predominate, in which the space may seem to be only one millimeter. The narrowest interval that should be permitted is, in my opinion, two and a half millimeters (one-tenth inch)."

In view of the formidable statistics we have given in regard to the prevalence of short-sightedness, it is evident, says the *Paper World*, that everything which will tend to lessen the evil should be undertaken without delay. Neglect in this matter will result in everybody's wearing glasses, and in seriously impeding the performance of all the world's work, especially those branches that particularly require the exercise of good eyesight. In the matter of printing, especially, reform is called for. There is no reason why small type, or type arranged in lines having inadequate space between them, should be tolerated, and the public should stoutly refuse to countenance the use of any school books or patronize papers and periodicals that are printed without regard to the best interests of the students' or readers' eyes.

[It is pleasing to know that the size of type and general style of printing still used, and first adopted by the SCIENTIFIC AMERICAN thirty years ago, are now recommended, by eminent authorities, to be the best standard for eye health. Our paper has always been regarded by printers and readers as a model for typographical excellence; hundreds of periodicals, at home and abroad, have followed it as a pattern. But the particular reasons why typography like that of the SCIENTIFIC AMERICAN has proved so satisfactory and popular, have perhaps never before been so clearly explained with measurements as by Prof. Cohn in his statement above given.]

The Examination of Food and Drugs.

The "Act to Prevent the Adulteration of Food and Drugs," lately passed by the New York Legislature, has been approved by the Governor. It provides that the State Board of Health shall take cognizance of the interests of the public health as it relates to the sale of food and drugs and their adulteration, and make all necessary investigations and inquiries relating thereto; and penalties are provided for any offenses calculated to impair the strength, quality, or purity of substances used as food or medicine.

The sanitary committee of the State Board met in this city July 6, and appointed, under the act, Drs. C. E. Munsell and A. L. Colby, of New York city, and Dr. T. Delap Smith, of Fulton county, as inspectors, to collect food for analysis. The examination of samples will be made by the following named chemists:

Dr. S. A. Lattimore, of the University of Rochester, to examine canned food and spices. Dr. Pitt, of Buffalo, to examine sugar, glucose, sirups, molasses, confectionery, honey, soda water sirups, and ice cream. Dr. Cauldwell, of Ithaca, to examine butter, cheese, lard, and olive oils. Dr. Englehart, of Syracuse, to examine wine, beer, spirits, and cordials. Drs. Lattimore and Hoffman, to examine tea, coffee, and cocoa. Dr. Cauldwell, to examine chemicals as met in pharmacy, quinine and its preparations, ether, and fruit essences. Dr. Chester, of Hamilton, to examine meat extracts, fish and fish extracts, and gelatine. Dr. Hoffman, to examine vegetable and animal drugs and all pharmaceutical preparations. Dr. Love, of New York city, to examine cereals, grain products, artificial cereals for the use of invalids and children, baking powders, and all chemicals used in baking. Dr. Chandler, to examine milk and its preparations.

Nitrates in Nevada.

An extremely important addition has lately been made to the list of valuable minerals found in Nevada. It consists in the discovery of large beds of nitrates near Brown's Station, Humboldt Desert. The State Mineralogist of California, Mr. H. G. Hanks, finds the mineral to be a very rich nitrate of soda, and regards the discovery as one of the most important ever made on the Pacific Coast. Mr. Hanks expresses the opinion that other similar deposits will be found, as large regions of Nevada and California are of a formation suitable for its existence. Many years ago he predicted the discovery of nitrates in the southern part of California, but as yet none has been found. The Nevada discovery will doubtless turn the attention of prospectors to this valuable mineral.

Hydraulic Mining in California.

The question of mining *débris* and the preservation of river bottoms endangered by the "slickens" and "tailings," deposits from hydraulic and other mines, has been brought before the courts in an action begun by the State Attorney-General against the Miocene Mining Company, praying that the Mining Company be restrained from discharging into the Feather River any dumpings or tailings. The desired injunction has been granted by Judge Denison, Superior Court, Sacramento county, Cal.