every clover-field, in June, in Michigan, south of 43 degrees. About 1870 a specimen of the turkey buzzard was captured here, and for a long time this note was unique, but within the last few years they have become regular summer visitors, and they have been found nesting at about 43° north latitude, on Lake Michigan's shore. There are dozens of other instances of cases where birds formerly unknown hereabouts, or but rarely met with, have, within the last twenty years or so, become comparatively common, or even abundant.

The second civilized cause of the unnatural means of change, namely, removal of forests, is remarkable in its effects, and yet, although more birds are forced to leave neighborhoods totally denuded than there are new species to occupy the locality, still a county about two-thirds cleared and well peopled is sure to embrace more species of birds than is one with its trees all standing. In a four years' residence at the north and in a new county, I was, although on the alert, and daily making notes, able to secure a list of only one hundred and twenty-odd species; while here, in a district inhabited over twice as long, and with over nineteen-twentieths of the area cleared, I have a list of over one hundred greater.

A locality where the trees were all felled would not contain a hawk, owl, woodpecker, grouse, warbler, fly-catcher, jay, crow, and many other species; but there are also many species, as house-wrens, barn and eave-swallows, chimney swifts, robins, blue-birds, sparrows, and finches of several kinds, kingfishers, and all the plovers, snipes, sandpipers, ducks, geese, and divers, which could remain with us, and many of which would not appear at all if the country was covered with forest.

The only species which I am satisfied are disappearing rapidly from the devastation of forests are the black woodpecker and wild turkey; of these, both once common, the turkey is being exterminated, while the log-cock has sought other quarters and is seldom seen here now. The raven, once abundant hereabouts, has gone forever, while its place is taken by its near relative, the crow, which was once not found in this locality.

Perhaps under this heading we may properly mention that group of birds which have modified their nesting habits to suit the requirements in order to associate with man, and, as we might say, secure his protection. A remarkable instance is that of the so-called cliff-swallow, a bird which has appropriated the space around buildings under the eaves, and which is well known to the boys as the eave-swallow. It is impossible to say how long this modification has existed, but certainly not longer than three centuries, for even now the species clings to its primitive choice of location in the west, still sticking its mud-pellet habitation to the cliffs. The white-bellied swallow, house-wren, white-bellied nut-hatch, and blue-bird, all have modified their nesting habits to an extent, and occasionally occupy boxes and other receptacles placed for their accommodation. The common pewee boldly enters our barns, out-houses, and even attempts to occupy a nook on the front porch, from which it is unceremoniously ousted. Some years ago I found two pewee's nests built in the original style; they were attached to the roots of overturned trees. This was undoubtedly the primitive method of the pewee, until the fortunate appearance of civilized man, when little pewee quickly came to know an advantage, and he adopted buildings and bridges instead of overturned tree-roots.

The barn-swallow must have adopted the custom of building in the peaks of buildings many generations ago, for no one knows of its ever nesting otherwise. It is even said that the martin was provided with gourd houses before the discovery of America in 1492, and that the natives afforded protection to this favored bird. It now accepts the boxes erected for it, or nests in the cornices of buildings in our cities and towns. The chimney-swift is the best example of a species changing from a life in the solitudes to the busy scenes of village and city. Once the swift must have nested in the cavities of trees, and I have heard of nests being found in huge, hollow sycamores, but at present the birds almost confine their nesting haunts to unused chimneys.

The third cause of change, viz., drainage of land and water, does not produce the great influence that the removal of forests does. Nevertheless, it exerts more of a change than one would credit. Many places where rails once nested in abundance, and ducks annually stopped on their migrations, are now comparatively dry fields and yield good crops. However, these drainings are almost compensated for by the overflow occasioned by the damming-up of streams and the outlets of lakes, as a head for mills, and, further, where lakes have been lowered by various means, it has not infrequently happened that the uncovered shore-line, so increased, has offered attractions to certain littoral species which were formerly rare, but which are now taken seasonally during migrations.

Enough could be written on this subject to fill a book, but space forbids further comment. It has been plainly shown that peopling a locality, with not too heavy a sprinkling over the agricultural portion, and not too heavy a removal of the trees, actually increases the number of the species of birds, and, with a few exceptions, principally the ducks, increases the number of birds. Though our little corporation does not contain as many birds as formerly, as they are crowded out, I am satisfied that there are in our county each year at least fifty species of birds unknown to the locality fifty years ago.

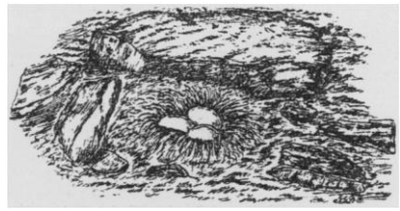
Kalamazoo, Michigan.

THE DUCK ISLANDS.[1]

BY LEVI W. MENGEL, ENTOMOLOGIST TO WEST GREENLAND EXPEDITION, 1891.

WE left Upernavick toward noon of July 1, with the "Kite's" head to the north-west. On the following morning we were awakened by the cry of "Land, Ho," and upon reaching the deck saw in the distance several small specks, which we were told were the famous Duck Islands, so-called because almost their only inhabitants are the American Eider Ducks which congregate there in the summer to breed.

The party immediately began to prepare for the day's work, and at four o'clock we brought up under the lee of the largest of the islands. The Duck Islands are situated about 73° north and 58° west, and are three in number. They are all small, the largest



AN EIDER DUCK NEST.

not being more than a mile and a half in diameter; all near together, and composed of the same kind of rock, which appeared to be granitic or at least of some igneous origin.

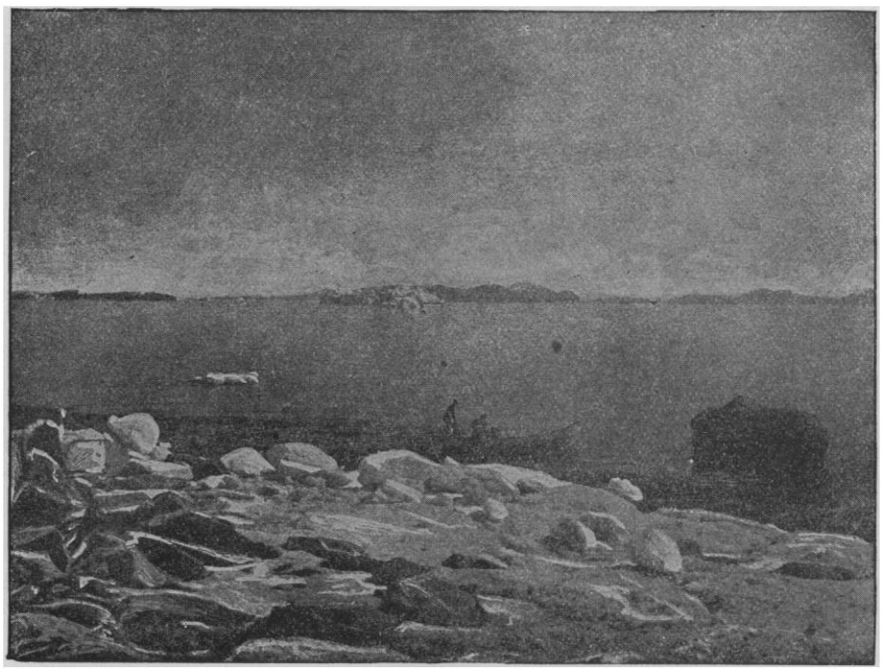
Our party were soon ready to go on shore. A gun was fired from the ship, and a black cloud of birds arose from the islands. They flew a short distance and then alighted, most on land, yet some in the water. We were soon on shore, and then began a day of sport and slaughter. A portion of the party was detailed to gather eggs and down for the use of Lieutenant Peary in the far north. The remainder of the party were to gun for as many birds as they could get; and we got them. Seldom did a shot fail to bring down a bird, and from every portion of the islands came rapid reports which told of slaughter and death. One could not walk even a short distance before coming to a nest, and not unfrequently did the female wait until almost trodden upon before flying. The male birds betook themselves away upon the first scent of danger, and upon the water nearby, just provokingly beyond gunshot, could be seen numbers of them, many wounded but sufficiently active to keep away. Of the birds shot the females largely predominated, probably ten to one.

The nests of these birds were all built on the ground (see illustration), some on the open, and some few under the shelter of

[1] The plates have been kindly loaned for this article by Dr. R. N. Keely, Jr., of Philadelphia, and are from his excellent narrative "In Arctic Seas."

huge rocks and boulders. They varied somewhat in size, though averaging about a foot in diameter, outside measure. They were uniform in color, made of fine feathers and down plucked from the breast, the whole effect being dull gray. The eggs were from three to six in number, of a dull grayish-green or drab color, which varied slightly in the different nests. The average of fifty-one eggs from thirteen nests is 3.05×2.00. The female, if startled, deposits excrement, and partially covers the nest with down by a quick back motion of her feet. In many nests examined this was not the case, and in all probability the female was away feeding at the time of our arrival. Nearly all of our party reported the same in the nests of startled birds. Whether done to conceal the eggs or whether done through fright is entirely a matter of conjecture.

At the time of our visit to Duck Islands, incubation was begun in nearly all cases; in many far advanced; and though several barrels of eggs were collected, there were but very few which would be of any use to Peary. The birds, though to us they seemed very abundant, were thought by Captain Pike to be rather scanty in number. Probably some Arctic whaler had been there before us. This supposition may have been correct, as the sets of eggs we collected contained but from three to six, while most authorities give from six to ten as the normal number.



DUCK ISLANDS.

Besides the eider ducks, there was but little else of interest on the islands. Two or three snowflakes, *Plectophanes nivalis* (Linn) Mayer, a northern phalecope, *Lobipes hyperboreas* (Linn), Cuv., and a single king-eider, *Somateria spectabilis* (Linn) Boie, made the entire list of birds. Several spiders and an ant, which was not caught, made up the rest of animal life observed; although there were several pools which looked as if they might be worthy of investigation.

The "Kite" had been steaming constantly from place to place, to avoid the bergs floating in the vicinity; and at 12 M., much against our wishes, we were recalled to pursue our journey northward.

Reading, Pa., Sept. 19.

PREPARATION OF TEACHERS OF SCIENCE AS CARRIED FORWARD IN THE MICHIGAN STATE NORMAL SCHOOL.

BY E. A. STRONG.

THE list of towns and villages in our country having a population below 20,000, or even below 10,000, is a large one. In these towns the number of pupils who attend a public high school is relatively much greater than in the larger cities, partly because these schools receive considerable accessions from the surrounding country, and partly because the smaller towns are not well supplied with private and technical schools to divide the attendance. So it comes about that a large part of the membership of the public secondary schools of our land is found in the villages and minor cities. In many of these towns education is a leading interest, the teachers are a favored and highly respected class, and the schools are managed with vigor and intelligence.

Now it is in the schools of these smaller cities and villages that the graduates of the numerous normal schools of our land find employment, either as superintendents, principals, or instructors. The district or rural schools rarely feel that they can retain the services of a trained teacher, so that the constant effort of normal faculties to induce their graduates to "go into the country and build up the rural schools" are only moderately successful. In the large cities the corps of teachers is usually recruited from the local high school or training school with little aid from without, and thus it becomes the distinctive work of the normal schools to give tone to education in communities too small to support a training school.

This is a great work, and it need hardly be said that it yet wants much of even reasonably complete accomplishment. Still, during the past few years there has been great improvement in the training of teachers, and the normal schools of the land are coming to deserve more and more the interest and sympathy of the friends of sound learning. A concrete example may best exhibit what the normal schools are doing or attempting, and the department of the physical sciences in the Michigan State Normal School will be used for this purpose.

Of the thousand students in this school rather more than one-half take the full or four-years' courses, and about one-third of this number specialize their work in the direction either of the biological or the physical sciences. Of those who elect the physical sciences about 63 per cent have during the past five years come to the school certificated as graduates of "approved high schools," 19 out of a class of 21 being the largest ratio and 18 out of 63 the smallest. Of those who went out from the school between the years 1885 and 1890, 86 are teaching or have taught physics in some high school, and fifty-four are teaching or have taught chemistry. These numbers seem small; but it must not be forgotten that many of these people take up teaching as a life-work, and that the number of normal schools with a presumably similar or better record is very considerable.