

surface of the stones was dry, and they sunk immediately when it became wet by touching or by the movement of the swell.

"The slate fragments collected on the sea surface had a specific gravity of 2.71. The specific gravity of the water in the channel was only 1.0049 at a temperature of 15° C. (59° F.). The largest stone which I obtained from the surface weighed 0.8 gram. Twenty of the smaller fragments had a mean weight of 0.3 gram. The fragments contained no air cavities perceptible to the unaided eye."

These stones, which are pictured in *Nature*, are, it must be confessed, extraordinarily large. The specific gravity of the Llano sand was 2.59 and the largest grains could not approach the stones above mentioned in size.

To quote further from Nordenskiöld :

"On examining the floating stones one could discern small gaseous bubbles attached to the under surface of them, and at the shore stones can be seen on the very fringe of the beach which are just beginning to float lightened by gaseous bubbles."

In my paper (p. 31) a possible explanation is offered for the presence of the 'gaseous bubbles': In one of my experiments I dug several holes in the sand forming a bank in the bed of the Llano and when their sides caved in, the dry grains forming the outer coat of the deposit, were gently launched and floated much more abundantly than in a previous experiment when the surface was damp. Furthermore, as each mass of sand slipped into the water, and exclusive of the floating grains, sunk, *the air contained in the interstices between the particles rose to the surface forming a patch of foam or froth.*

Again Dr. Nordenskiöld remarks :

"It is probable that the stones were not only provided with gas bubbles, which can be perceived by the eye, but that they were surrounded by an envelope of gas supported by an insignificant coating of algae, of which the stones are surrounded. At least, traces of diatoms and algæ are discernible on the stones after drying. The greasy surface of the mineral of which the stones consisted also prevented the water from adhering to them, and caused the stones to be surrounded with a concave meniscus, which naturally may have contributed to, and perhaps was the main cause of their floating, which sometimes was further facilitated by a patelliform shape of some of the bigger stones."

The floating sand of the Llano showed upon careful examination no signs of the presence of

low forms of vegetable growth, neither was it in the least greasy. That the presence of oil in a bituminous shale may facilitate its floating property can scarcely be doubted.

*Nature* for February 1, 1900 (p. 318), contains two communications upon 'Floating Stones' by Messrs. Cecil Carus-Wilson and R. C. T. Evans, respectively.

Most of the points made by Mr. Carus-Wilson are covered in the papers of Messrs. Graham, Ladd and myself. It may, however, be of interest here to call attention to the following. He says :

"The grains float as patches composed of fine and coarse material clinging together ; the presence of the very fine grains appears to facilitate the flotation of the larger grains and shells."

As bearing on this statement I will quote briefly from my paper :

"As I was sprinkling some sand upon the river for experimental purposes, a pebble almost as large as the end of my little finger fell into the center of a floating patch, which, to my great astonishment and delight, was depressed, like a funnel, for, say, half an inch before the cause of this unexpected phenomenon broke through its surface and sunk to the bottom" (p. 35).

His statement regarding the formation of 'patches' had also been anticipated in my paper (p. 36).

Mr. Evans writes that he has observed the phenomenon of floating stones at Kimmeridge, where the flaky nature of the beach material renders their appearance very common.

In experimenting with broken roofing slate he found that a small dried piece  $1.5 \times .75$  cms. by about 1 cm. floats easily on water when gently placed on the surface.

It will be seen from the above statements that all observers agree that to float, the sand or stones must be lightly launched without complete wetting.

FREDERIC W. SIMONDS.

UNIVERSITY OF TEXAS.

#### SEA-BIRDS A SANITARY NECESSITY.

THIS country is on the verge of losing forever one of the main features of its seacoast charms—the sea-birds themselves. In fact, the Terns, the most exquisite of the Gull family,

which formerly thronged our whole coast, have been so nearly wiped out by agents of the milliners that this year's onslaught, already fully organized, will glean almost the last pair from the few small breeding colonies which remain, wherever these are unprotected. And the larger Gulls, which are not only very beautiful, but absolutely essential as harbor scavengers, are also being decimated for the same purpose.

All these species, with their exquisite beauty, their wild voices and their most romantic lives, peopling a realm which, without them, would be oppressive in its dreary grandeur, will reach their breeding places in a few weeks, and the Terns, especially, are liable to be slaughtered the moment they get there; therefore the promptest action is necessary, if we are to save even the few pairs of the latter which could restock our devastated coast when the evil eye of fashion shall have turned to other victims.

Simple economic considerations make it a matter of course that the Gulls *must* be saved. An immense horde of them, which naturalists think number anywhere from a hundred thousand to a million, gorge twice a day in New York Bay upon garbage. As the hour of the 'dump' approaches, their multitudes fill the whole air to an immense height, over an area of several miles, then gradually settle on the sea in vast white sheets. The whistle of the police boat, the signal to 'dump,' seems to waft them simultaneously into the air, to gather, like dense snow clouds, over the floating masses just emptied from the many scows.

Imagine from what an amount of putrid matter these birds, as big as hens, save the adjacent beaches, not to speak of their perpetual gleaning in the actual harbors! And this is a specimen of what occurs at every port. And shall this incalculable sanitary benefit, and all this beauty, terminate forever, and for no worthy purpose?

If money enough can be raised, the Committee of the American Ornithologists' Union will guard every breeding place where there is a law to back them, as Mr. Mackay and Mr. Dutcher have done at Vineyard Sound Islands and Great Gull Island. The utmost caution will be used in choosing wardens, and the Committee will

be glad to receive names of men especially suited for the post. Light-house keepers and Life-Saving Station captains will be employed wherever feasible. A very encouraging sum is already in the hands of the Committee.

The places to be protected are certain islands on the coast of Maine, Long Island, New Jersey, Maryland, and perhaps Virginia and Florida. In Maine alone there is need of all the money we can possibly get, since there single wardens are afraid to face the rough plumers, and some more elaborate organization is the only hope.

The American Ornithologists' Union therefore appeals to every bird-lover for money to be used in hiring wardens to protect the birds while nesting. Contributions should be sent to Mr. William Dutcher, treasurer of the Union, at 525 Manhattan avenue, New York City, who will furnish all desired information.

ABBOTT H. THAYER, WILLIAM BREWSTER, Pres. Mass. Audubon Society; WITMER STONE, Chairman A. O. U. Com. on Bird Protection; ROBERT RIDGWAY, President A. O. U.; C. HART MERRIAM, Chief U. S. Biological Survey; Vice-Pres. A. O. U.; A. K. FISHER, Ass't. Biologist, U. S. Biological Survey; J. A. ALLEN, Curator Vertebrate Zoology, Am. Mus. Nat. His.; FRANK M. CHAPMAN, Ass't. Curator Ver. Zoology, Am. Mus. Nat. His.; WILLIAM DUTCHER, Treasurer A. O. U.

March 17, 1900.

#### NOTES ON ELECTRICAL ENGINEERING.

##### A NEW INDUSTRIAL SITUATION.

IN a pamphlet recently issued by the Westinghouse Companies, Mr. Geo. Westinghouse calls attention to the prospective use of the gas engine on a great scale for the generation of power and, in connection with central gas plants and pipe lines, for the distribution of power. Mr. Westinghouse says that "long familiarity with the electrical industry, the pipe line transportation of natural gas in great quantities, and an active interest in the development of large gas engines, satisfy me that the great economies which will result from the distribution of power by means of gas generated at central points, and conveyed in pipes along the lines of railway for the operation of gas