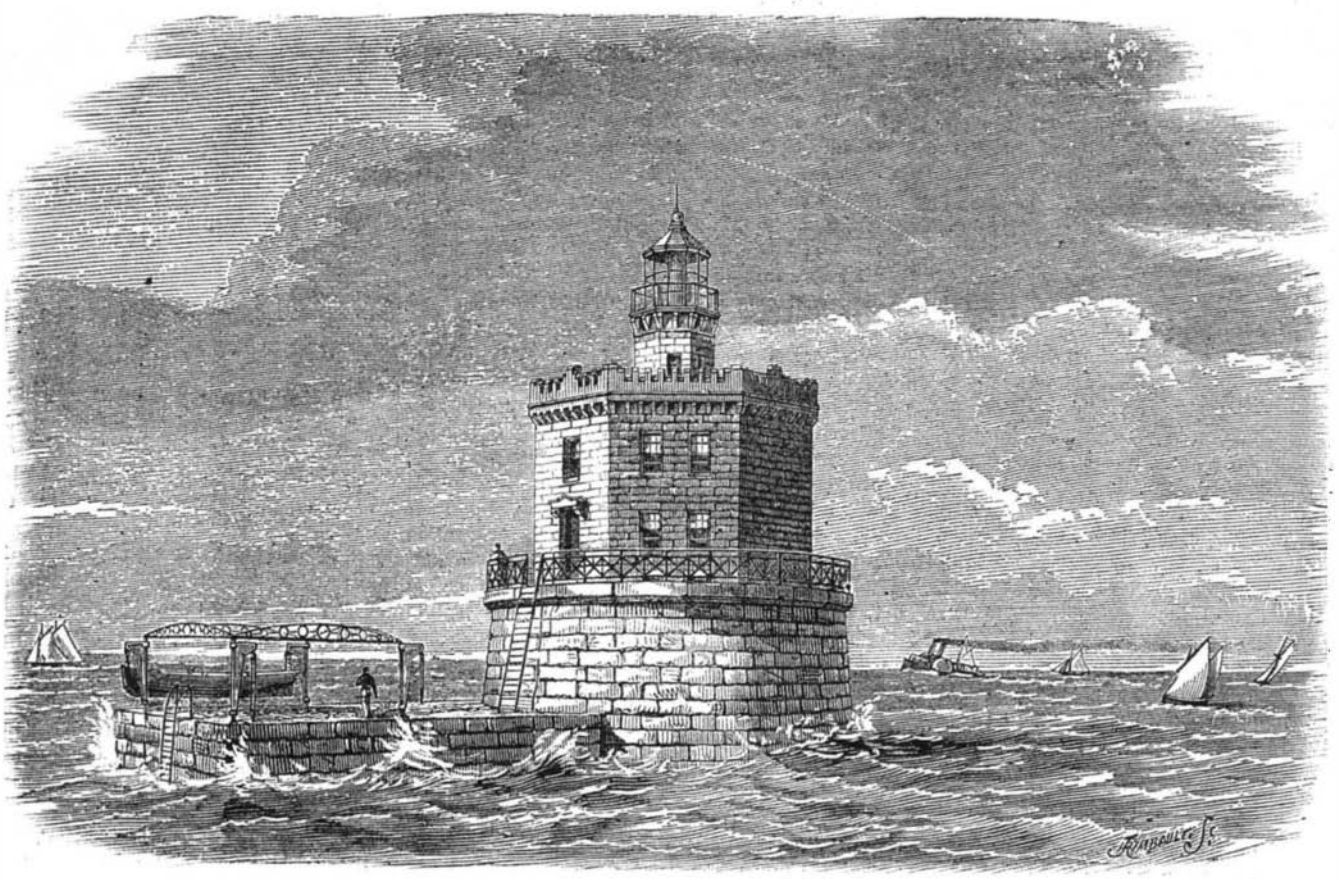
AMERICAN LIGHTHOUSES.

Last year the Lighthouse Board of the United States had under charge 179 sea and lake coast lights, 394 river and barbor lights. 22 lightsbips, and 33 fog signals operated by steam or hot air engines, besides large numbers of unlighted beacons and buoys. Naturally the great diversity of the conditions under which the American lighthouses have to be erected, and the fact that the great extent of coast has necessitated the division of the work of superintendence into thirteen districts, each with its own engineer, have led to considerable variety of design, and we illustrate herewith two of the lighthouses lately erected by the Board, the first engraving showing the Race Rock lighthouse, and the second engraving that at Thimble Shoal, at Hampton Roads, Va.



LIGHTHOUSE AT RACE ROCK—EASTERN ENTRANCE TO LONG ISLAND SOUND.

The Race Rock lighthouse, at the eastern entrance to Long Island Sound, is one belonging to the third district, of which Colonel I. C. Woodruff is engineer. The general design of the structure is shown by the engraving, and we need merely add here that the foundation consists of about ten thousand tuns of riprap stones, weighing from three to five tuns each. The foundation was completed in November, 1871.

The Thimble Shoal lighthouse is in the fifth district, of which the engineer is Major Peter C. Hains. This light has been erected to take the place of the Willoughby Spit light ship, and it is situated on the shoalest point at the entrance to Hampton Roads. A start was made with this lighthouse in May. 1872. and on the 10th of June of that year the platform, which the screwing of the piles into the shoal was carried on, was completed. The shoal proved to be very hard, consisting of fine compact sand, but by the 1st of August, 1872, the last pile was planted. The light is of the fourth order, and the general design of the structure is very neat.

LIGHTHOUSE AT THE THIMBLE SHOAL, HAMPTON ROADS, VA.

We may add, says *Engineering*, to which journal we are indebted for the illustrations, that the chairman of the Engineering Committee of the United States Lighthouse Board is General Barnard, and the engineer secretary, Major George H. Elliot.

The Cocuyo.

M. de Dos Hermanos has recently succeeded, after considerable trouble, in transporting from Cuba to France some fifteen hundred living cocuyos. These insects he has submitted to the French Academy of Sciences, for dissection and general examination.

The cocuyo appears in Cuba generally toward the end of April, after the first rains, and abounds in wooded places and cane fields. It emerges at twilight, but its nocturnal promenade lasts barely over two or three hours. In hollows of trees, under masses of shrubs, among the young portions of cane plantations, it finds favorite places of concealment, feeding upon tender leaves, the soft substances found in old trunks of trees, and analogous materials. It appears that dampness is a condition essential to the insect's existence.

At about the end of July, the cocuyo disappears; but insects may be kept imprisoned in baskets or cages, if carefully guarded and nourished, until September or October. The cocuyo should not be confounded with the aquacero, a name given to an insect exactly resembling the former but hardly one third its size. The aquacero remains out and shows its phosphorescent light during the entire night. The brightest radiance of the cocuyo is found in the ventral region; and it appears at its greatest splendor when the insect flies or is dipped in water. Although completely inoffensive to man, the cocuyo is of quarrelsome disposition, since it attacks its fellows in a terrible manner, especially when a number are confined together. The claws form its offensive arm, with which it often penetrates the neck of its adversary so completely as to separate the thorax from the body. It frequently loses its weapons by the operation, M. de Dos Hermanos mentions instances where the insect has nevertheless continued to exist for some months afterward. The mutilation of the members doubtless hastens death, the approach of which can be foretold by the darkening of the eyes which, when the cucayo is in a state of health, are of a yellowish white. MM. Robin and Laboulbène have taken up these interesting insects as subjects of investigation, and we find their report in full in a recent issue of *Les Mondes*. Several cacuyos have been dissected, and it is stated that, independently of the two phosphorescent organs (which are very apparent in the form of oval shaped dusky yellow colored spots, situated one on each side of the dorsal face, behind the corselet), there exists a third, different from the others. The latter appears to be a large plate, of a yellowish white tinge, placed on the ventral face of the body, between the thorax and abdomen. The insect exposes and render it luminous at will, especially when the elytræ and wings are spread and the abdomen a little turned toward the dorsal portion. Whenever one of these dorsal or ventral organs is uncovered, its moist and brilliant surface darkens in color, and slow irregular movements, due to the contraction of the striated muscular bunches which are inserted in the lower face, supervene. Sections of the different organs show that they are lenticular in form, about one third as thick as broad, and are contained in a deep adipose envelope. The latter is entirely formed of very large cellules, containing numerous fatty globules, as in the adipose tissues of insects; and it has very many healthy vessels in comparison to the rest of its structure. The tissue proper (semi-transparent and damp, forming the central portion) is the most voluminous. It is composed of cellules which do not differ sensibly from those which constitute the luminous organs of the *lampyræ*. These cellules are closely contiguous to each other; and between their adjacent faces, are found only wind pipes and nerve tubes, with the exception of which the mass of the tissue thus constituted may be subdivided into lobes and lobules.

Brown and Linnæus have already pointed out that the luminous production of the *pyrophorus* is governed by its will. The light appears first at the center of the organ and then extends over its whole surface, becoming more brilliant and greenish as its area enlarges. It is well known that, during repose and outside of all nervous influence, the electrogeneous apparatus of fishes passes to a state of electric tension more and more pronounced, from which the fishes free themselves suddenly when they so desire or when under the experimental influence of such and such physico-chemical action. Now in the present case, consider the investigators, the probabilities are that the phosphorescent tissue produces little by little a substance which accumulates slowly in the producing cells themselves independently of all nervous influence, by operations of the same order as those of various secretions, and that the only act by which the discharge takes place is voluntary. The principle which renders luminous during several minutes the substance of broken cellules acts like noctilucine, a nitrous coagulable phosphorescent principle obtained by Phipson from the luminous mucus of certain scolopendræ, fishes, etc. It is a natural principle of little stability, of which the chemical and molecular segregations take place as soon as it becomes free, and which manifests itself by a production of light alone, without beat and in a manner similar to that caused by the accidental decomposition, putrid or not, of different kinds of tissue, mucus, sugars, etc.

The abundance of urates in the substance of the cellules where the disengagement of light takes place, it is believed, indicates that uric acid is one of the crystalizable components resulting from the photogenic decomposition of the above mentioned coagulable substance, since it is gradually eliminated, like the crystaline principles of similar disassimilations.

In St. Andrew's church, Dublin, an excessive reverberation of sound has been checked by stretching wires across the building.