vessels carrying the same weight (in guns and armor plating together) distributed as a broadside battery. The result, as he gives it, is that for one cupola, as against the corresponding broadside ship, the cupola has the advantage; for two cupolas the advantages are, if anything, in favor of the broadside, although nearly balanced; but for three or more cupolas, the broadside arrangement has a marked superiority, which increases in a rapid ratio with the size of the vessel. He accordingly comes to the conclusion that the proper use of the turret is for moderate sized vessels carrying one, or, at most, two of them; and he thinks that one or two cupolas may be usefully substituted for pivot guns on the upper decks of ships of the line carrying a heavy broadside armament. Finally, he remarks that this is a question for the naval officer, rather than for the naval architect, to decide, since neither plan presents any constructive difficulty, and he quotes Capt. Symonds' authority for stating that speed and facility of maneuvering are of at least as high importance as complete protection.

Correspondence

Geological Age of the Desert of Sahara.

Messrs. Editors:—Recent discoveries made in this great tract of barren land by the French commission of scientific gentlemen, have decided this mooted point, at least so far as the northern half of it is concerned, as far south as the ridge of table land dividing the southern slope from the northern. It formerly has been held that the age of this largest desert of the globe was tertiary. But M. Desor, a gentleman well-known in scientific circles for his devotion to surface geology, and who has traveled extensively in our country, has settled the question that the northern half of Sahara is part tertiary or modern, by the finding, far inland, deposits of shells, such as the edible clam, perriwinkle and muscle, which now live in the Mediterranean ; in other words, of the same age as the bordering edge of the Atlantic from Martha's Vineyard to Cape Sable in Florida.

The most interesting discovery in geological science has been made by the Canadian geologists; this is the presence of organic forms in the so-called Laurentian formation of Canada; the primitive of older writers, and azoic of modern, because of the absence of all signs of life having existed in that age of the world when its strata were formed. The stone-record of ancient life has been heretofore supposed to terminate with the Taconic, or that age or system of rocks which immediately succeeds the azoic.

In the progress of the geological survey of the State of New York, the late very eminent Dr. Emmons demonstrated that the authentic records of life went back further than the English and New England school of geologists placed it, viz., at the base of the silurian or the Pottsdam sand-stone of New York State, and he even suspected that certain lime-stones of the primitive were zoic.

Early in the writings of the former Dr. Mantell, of England, are figured and described certain forms in granite which were suspected to be the rings of infusoria. It was reserved for the Canadian gentlemen to demonstrate that the simplest forms of animal life, viz., rhizopods or foraminifera, had been preserved to us in the (primitive) Laurentian of Canada. The shell of the animal is still preserved in lime, while the cavities once filled by the body of the living animal are now found to be filled by deposits of silica, aluminous material, serpentine and pyroxene. By means of acids the lime can be removed and the form of the animal's body, preserved in the silicious cast, is exactly ascertained. A noticeable feature of the rhizopods of the Laurentian, are their magnitude. In the silurian, as found in the galena lead bearing rocks, and in the northern regions of Frobisher's straits, as discovered by Charles Hall, the latest arctic explorer, they were of monstrous dimensions. In the recent seas they are almost always microscopical.

It seems to be a law that the various forms of animal life shall begin at the minimum of size and numbers, increase to the maximum, and then suffer a decline, until they either disappear or linger but the shadow of their former glory and power. Guided by this law of analogy, supposing it to hold authority in this earliest period of animal life, our imaginations are carried back to a period immensely remote in the antiquity of time, when life began in the primitive seas, in its simplest forms—the very first letter of its alphabet—and gradually increased in its maximum, before other forms were introduced which have become familiar to us in Taconic strata.

R. S. Stevens.

New York, June 9, 1864.

THE REBEL TORPEDOES.

Appended is a copy of a report made to the Ord, nance Department upon some new rebel torpedoes recently found in the Rappahannock. We are under obligations to Commander H. A. Wise, Chief of Ordnance for the report and diagram.

U. S. S. *Matthew Vassar*,
May 18th, 1864.

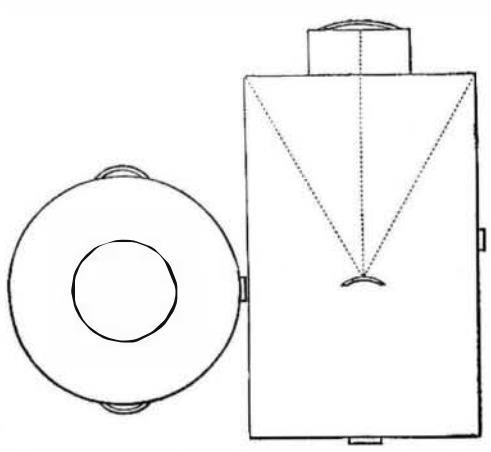
Sir:—In obedience to your order, I report the following experience in the use of a torpedo, taken from the rebels in the Rappahannock river:—

The torpedo is a cylindrical tin vessel, with a second small cylinder at the top, and with three apertures—one on the side and bottom, for the purpose of receiving the powder, which apertures are afterwards closed with a gutta percha wad; and on the wad, outside, is a covering of bees-wax and tallow. The other aperture is at the top, and is for the purpose of receiving a friction primer, which is put in *first*, and the aperture then made water-tight, by filling in with bees-wax and tallow, mixed.

The friction primer is attached to the end of a wire, —which extends from the outside to the center of the vessel—so that the primer lays in the middle of the powder always.

To prevent the primers from having any lateral motion, three wires are soldered on to the sides of the vessel, and join in the middle nearly; so that the primers may pass through their bent ends, without danger of catching or moving. The small cylinder at the top of the torpedo is covered with a tin cap, so as to hold the pulling line, and prevent it from being touched until the torpedo is sunk, at which time the cap is removed, and the line led out to the shore.

The torpedo holds about fifty pounds of fine priming powder: and I enclose here a diagram, showing dimension, etc,



Length of case, 14 inches; diameter of case, 12¼ inches; length of cupola, 4 inches; diameter of cupola, 4 inches; length of tubs, ¾ inches; diameter of tubs, 1¼ inches.

After informing myself thoroughly as to the manner of using this new weapon (by carefully opening one,) I exploded another in the following manner:—Having attached a sinking weight to the two handles, which are on the sides, I pulled with a small boat into the channel, and then ran my line ashore; and after this was done, I carefully removed the tin cap, and lowered the torpedo in three fathoms water. The boat was then pulled ashore, and the line pulled from about fifty yards back, in the bushes, when, without any noise, a column of water, sixty feet high, and five feet in diameter, was thrown up; and covering the woods with spray, fell, sending a circular wave about one foot high to the surrounding shores. The appearance was grand, and if a ship was directly over one of these torpedoes, she would in all probability be sunk, but if alongside, (except receiving a quantity of water on deck,) I do not believe she would be injured.

With the information gained, I feel competent to use the remaining torpedoes against the rebels, whenever it is required of me.

T. H. Eastman, Lieut. Comdr. U. S. N.,
Comdr. Foxhall A. Parker, Comd'g. Potomac Flotilla.

Mode of Silvering Wood.

Messrs. Editors:—On page 350, of the current volume of the Scientific American, you state that you know of no method of silvering woods. Thinknig it will be of some service I herewith send you a process, an experiment of Mr. Spencer of England. The first operation is to take strong alcohol or spirits of turpentine in a glass vessel, and add to it a piece of phosphorus (a common corked vial will answer the purpose); the vessel must now be placed in hot water for a few minutes, and occasionally shaken; by this means the alcohol will take up about a three-hundredth part of its bulk of phosphorus. Next procure a weak solution of nitrate of silver, place it in a flat dish or saucer; the face of the wood must now be dipped in this solution, and let itremain a few minutes to allow capillary attraction to draw it into the wood. This operation being performed a small portion of the solution of phosphorus must be placed in a capsule or watch-glass, and this placed on a sand-bath that it may gradually evaporte. The wood must now be held with its surface over the vapor, and an immediate change takes place; the nitrate of glass is decomposed, and gives place to metallic silver. When the material to be acted on is not very large, fasten it to the top of a bell-glass receiver with a bit of pitch or cement, and placed thus over the capsule on the sand-bath; the phosphorus vapor is by this means equally diffused, and not dissipated. A solution of phosphorus in sulphuric ether also answers; and a solution of gold (chloride) may be used. This elegant process as applied to wood and those substances which may be wetted with the solution of nitrate of silver, answer perfectly; but it is obviously limited in its application to those substances which will absorb an aqueous solution.

Charles S. Oberteuffer.

Philadelphia, May 25, 1864

RE-ISSUE OF A PATENT CASE—IMPORTANT DECISION.

We give the following abstract of a very interesting patent case, the first of its kind, decided by the Supreme Court of the District of Columbia, on June 6th instant:—

United States *ex rel.* Andrew Whitely, *versus* Commissioner of Patents.

On the 4th of September, 1855, Jonathan Haines obtained a patent for the United States, for improvements in mowing machines. On the 22d Nov., 1856, he granted the right to the invention, as then secured in the State of Ohio, to Ball, Aultman & Co. On the 13th of April, 1858, Haines obtained a re-issue upon said patent. On January 15th, 1860, Haines assigned the undivided third of the patent to his brother Ansel Haines. On 25th January, 1860, Jonathan and Ansel Haines granted to I. A. and W. C. Hawley a license to make, etc., "the Haines Illinois Mower," in certain counties in Illinois. On the 10th of April, 1863, Ansel re-assigned to Jonathan all his right, thus revesting in the patentee the whole interest in the patent and invention, excepting the above interests in Illinois and Ohio. On the 17th April, 1863, Haines, the patentee, assigned to Andrew Whitely, all his right, title and interest in the invention and patent; and upon the 20th May, 1863, executed a further assignment, expressly authorizing Whitely to re-issue, and to do all that he could do, if he had retained the interest thus transferred to Whitely. Upon May 21st, 1863, the said Whitely, surrendered the original re-issued patent, paid in the fee, and in all other respects complied with the regulations of the law, and asked a second re-issue.

The second re-issue was necessary, because under the first re-issue, the patent was too defective to sustain a suit, and the grantees of Ohio, taking advantage of this defect, were making and selling many thousand machines in Whitely's territory. They were requested to unite in the application for re-issue, but refused to do so. The Commissioner of Patents held, that Whitely was not the proper person to ap-