DECEMBER 4, 1880.]

success as this would cause in all steam engineering must at beria to Living and Extinct Myriapods," by Prof. S. H. and build. once be perceived, and the preliminary trials made in Eng- Scudder; "The Basin of the Gulf of Mexico," by Prof. J. land, as well as the practical demonstration of the system E. Hilgard; "Observations on Ice and Icebergs, and on the exploration of the basin of the Gulf of Mexico and its apafforded by the voyage across the Atlantic, seemed to bear Duration of the Arctic Winter," by Lieutenant Schwatka; proaches since 1846. The systematic prosecution of the out the conclusion that something at least approximating to and "The Turquoises of New Mexico," by Prof. Silliman. what was claimed for this machinery had been obtained, under circumstances which made the tests substantially complete.

In view of the importance of the matter, therefore, the Secretary of the Navy, in August last, ordered a trial to be Hatteras, on a line parallel with the coast and about 120 made, by a Board of United States Naval Engineers, of the machinery of the Anthracite, and their report has just been a gently sloping sea bed, as has heretofore been supposed to submitted to the Department at Washington. The Examining Board consisted of three Chief Engineers of the Navy-Messrs. C. H. Loring, S. P. L. Ayres, and George W. Magee-assisted by three assistant-engineers, for making and recording observations, and taking indicator diagrams, and the trial continued through twenty-four consecutive during last summer's cruise, and proved very interesting hours. The water evaporated by the boiler was carefully | from a geological point of view. The eastern slope has not measured, and the coal used was accurately weighed. The vessel was made fast to the wharf at the Navy Yard, are to be determined in next year's cruise. The sides of Brooklyn, N. Y., and the test was particularly directed to this plateau are steep. Three ship's lengths from a point ascertaining the horse power obtained from the known consumption of fuel and evaporation of water. The following were the results, as given in the Evening Telegram:

Pounds

 Total quantity of coal consumed
 4400

 Total quantity of feed water pumped into boiler
 35,114

 Average steam pressure in boiler
 35,114

 Average vacuum in the condenser, in inches
 264

 Average pounds of coal consumed per hour
 1836

 Average pounds of coal consumed per hour per square foot of grate
 11.98

 Average indicated horse power
 11.98

 Pounds of coal consumed per hour per indicated horse power
 27115

 Pounds of feed water consumed per lour per indicated horse power
 27115

 Pounds of feed water consumed per lour per indicated horse
 27116

67·7081 2·7115 21.63875 power

It will be seen that, in this trial, so far from obtaining one horse power per pound of coal per hour, it required nearly $2\frac{3}{4}$ lb. of coal per horse power per hour. This result is attributed principally to the fact that the steam pressure was comparatively low. In the former trials, and on her voyage, this region was remarkable rather for its immense quantity velocity than those of the Yucatan channel. about 450 lb. pressure was maintained, and the machinery is than for the number of species. Under the strong current especially adapted to work constantly at a pressure as high of the Gulf Stream the plateau was almost entirely bare of nation is found in the fact that the Cumberland bituminous fessor Agassiz spoke of the great success of the expedition, eoal was used in the Navy Yard trial, while Nixon's steam and said that their facility in dredging had become somenavigation coal was used in the English tests. One object thing extraordinary by long practice, and the work they on the Maxim incandescent lamp, awakened unusual inof the voyage of the Anthracite over here was to test the had been able to accomplish in six weeks was wonderful. capacity of her machinery with the employment of different When the Blake made her first cruise one haul a day was kinds of coal. The furnaces had been theretofore worked considered pretty active employment; the last day they scribed at length. The globe of the lamp having been filled principally without any artificial blast, although she is fitted were out this summer they made eight hauls. up with a fan blower to be used for obtaining high pressure, or should it be desirable from the nature of the fuel. the theory of Darwin's, ascribing the production of atolls to that part to become incandescent before the rest. The re-It was especially intended to experiment with anthracite continuous subsidence. The reefs and atolls of Florida and sult of this local heat is that the gasoline vapor is decomcoal, but it will be readily understood that, in experiments Yucatan furnish abundance of evidence of such formations with these different kinds of fuel, extending over only a where there has been no subsidence. brief period, the economic results obtained are not to be fairly compared with what might be achieved under a in 1851, when Prof. Louis Agassiz, accompanying the Gulf same temperature, forms the value of the invention. Prolonger experience. In every other respect the trial was a Exploring Expedition, examined the structure of the Florida fessor Morton then gave the results of his experiments with decided success for the Anthracite's machinery, and it is to reefs. The only strict atoll observed was one forming on a lamp arranged to run at a high candle power, say 1,500 be regretted that the experiments were not continued long the Florida coast, which had been fully investigated by candles. Run under such conditions as to give a light of 40 enough to practically demonstrate whether the Perkins the expedition. After giving a brief history of opinion on candles, the calculation showed a development equal to 240 system would or would not do all that is claimed for it.

PROGRESS IN AMERICAN TELEGRAPHY.

The annual report of the president of the Western Union Telegraph Company for the year ending June 30, 1880, fnrnishes many figures of interest to others than the stockholders of the company. The latter, however, appear to have no Islands, on the coast of Cuba, and off the peninsula of Yu- 1,500 candles. reason to complain, the net profits of the company for the catan. The formation of the peninsula of Florida south of year footing up over \$5,000,000, the capital stock of the 87° north latitude, and that of a portion of the Island of Academy, during its earlier sessions at least, was Professor company being about \$41,000,000. The net profits for the Cuba, as well as the structure of the Florida and Yucatan Wolcott Gibbs' new method of analyzing metals by electrofourteen years from 1866 to 1880 exceed \$45,000,000. telegraph business of the year is represented by 29,215,509 messages, \$12,782,894.53 receipts, \$6,948,956.74 expenses, and \$5,833,937.79 profits. The company has in operation an original folding of the crust of the earth, and the inquiry upon the mercury and the beaker beforehand, and then 85,645 miles of line, 233,534 miles of wire, and occupies must consequently start with the time when this substratum after the process to determine the metal by again weighing 9,077 offices. The new offices established and equipped dur- was laid. In order that the coral reefs might grow upon the vessel and the mercury. This method, he said, was aping the year number 543. The number of messages sent these submarine plateaus there must be a certain depth of plicable to mercury, tin, cobalt, and other metals. It did was over 4,000,000 more than the year before. The increase water-about 90 feet-and there must be a sufficient drift not apply in arsenic and antimony. He did not despair of in mileage of wire was 22,000 miles; the increase in miles of and deposit of food at the points where they were found. separating potassium and sodium by the process, although

vantage of this system, claiming that they practically urement of New Forms of Electric Lamps Operating by In- tained during the voyages of the Challenger that every

The papers by Professors Agassiz and Hilgard add mate- was exhibited together with a map. rially to the knowledge of our South Atlantic Coast, the Gulf of Mexico, and the Caribbean Sea.

miles distant, Professor Agassiz said that instead of finding exist in these latitudes, the dredgers discovered what proved to be a continuation of the plateau the northern portion of southeasterly limit resting, it is supposed, on the Bahama Banks. The western ledge on this plateau was examined been traced. Its exact limits are a matter of conjecture, but where a depth of 100 fathoms had been reached, the sounding apparatus did not strike bottom until 450 fathoms of the line had been paid out. The most animal life is found on the edge of the plateau. The character of the animals is, Gulf of Mexico and the Caribbean Sea. The edges are comcourse of which extends over the entire length of this Atlantic plateau. The expedition found at the outfall of the point in the tropics. The deposits of numerous rivers

In his second paper Professor Agassiz directly combated

this subject, and explaining in connection with it the strucabout equidistant between the one hundred fathom line and horse power; at 49 candles, 426 per horse power; at 98 canthe northwest shore of the peninsula, Prof. Agassiz instanced the latter as an illustration of what is going on upon lamp would stand; he had himself run it up to 250 candles, a gigantic scale on the Florida coast, along the Windward and it was stated by the inventor that it was capable of Yucatan peninsulas was laid either by volcanic action or by battery. By the electric action the metal was thrown down

obtained one horse power per pound of coal per hour, candescence," by Prof. Henry Morton; "On the Intimate square mile of the sea contains from two and a half to three whereas about two and a half pounds of coal per horse Structure of Certain Mineral Veins," by Prof. Benjamin tons of limestone. Thus these plateaus were raised little by power per hour is required in some of the best patterns of Silliman; "Mineralogical Notes," by Prof. Benjamin little until their altitude was such that coral settlements marine engines and boilers. The radical change which such Silliman; "On the Relationship of the Carboniforus Eupho- could be established, and these little creatures could grow

Professor Hilgard began by reviewing the history of the work did not begin until 1872. A relief model of the basin

The area of the entire Gulf, cutting it off by a line from Cape Florida to Havana, is 595,000 square miles. Suppos-Speaking of the work begun last June, south of Cape ing the depth of the Gulf to be reduced by 100 fathoms a surface would be laid bare amounting to 298,000 square miles, or rather more than one-third of the whole area. The distance of the 100 fathom line from the coast is about 6 miles near Cape Florida; 120 miles along the west coast of Florida; at the South Pass of the Mississippi it is only 10 which is known to extend as far as Cape St. George, its miles; opposite the Louisiana and Texas boundary it increases to 130 miles; at Vera Cruz it is 15 miles, and the Yucatan banks have about the same width as the Florida banks.

The following table shows the areas covered by the trough of the Gulf to the depths stated:

Depth.	Area,	Differences
2,000 fathoms.	55,000 square miles.	
1.500 "	187,000 "	132,000
1,000	260,000 ''	73,000
500 "	326,000	66,000
100 ''	387,000	61,000
Coast line.	595,000	208,000

The maximum depth reached is at the foot of the Yucaon the whole, the same as that of the species found in the tan banks-2,119 fathoms. From the 1,500 fathom line on the northern side of the Gulf to the deepest water close to posed of rich deposits of alluvia and mud, washed from the the Yucatan banks, say to the depth of 2,000 fathoms, is a top of the plateau by the action of the Gulf Stream, the distance of 200 miles, which gives a slope of five-ninths to 200, and may be considered practically as a plane surface.

The Yucatan channel, which is the feeder of the Gulf, has Gulf Stream a wealth of marine life larger than at any a depth of 1,164 fathoms and a cross section of 110.36 square miles: the Strait of Florida in its shallowest part, opposite flowing into the Atlantic Ocean serve to enrich the Jupiter Inlet, with a depth of 344 fathoms, has a cross secwestern slope. The plummet would sometimes sink tion of only 10.9159 square miles. As a consequence of this from 18 to 20 feet into the slimy deposit. The fauna of disparity the waters of the Florida Strait must show a greater

Referring to the model, Prof. Hilgard called attention to the important fact that the depth of water off the mouth of as 500 lb. without any undue strain or wear. A further expla- animal life. In summing up the results of the cruise Pro- the Mississippi was such as to warrant the conclusion that the jetties would always prove sufficient for their purpose.

Professor Morton's electrical papers, particularly the one terest. Mr. Maxim's method of building up and equalizing the resistance of the carbon filament of the lamp was dewith the vapor of gasoline, the electric current is turned on. Any unequal resistance in any part of the carbon causes posed in the vicinity of this point, and its carbon deposited upon the very spot where it is wanted. This building up The first note of dissent from Darwin's theory was sounded of any defective points until the whole filament is of the candles per horse power. At 52 candles the rate was found ture of the Alacran reef now forming off Yucatan at a point to be 336 candles per horse power; at 12 candles, 136 per

dles, 607 per horse power. This was far inside of what the

Perhaps the most important information presented to the The banks, were embraced within the scope of the paper. Prof. lysis. His plan is to place the metal in solution in a beaker, Agassiz conceived that the foundation of the Florida and add pure mercury, and connect the mercury with an electric

pole lines was 2,658. The ratio of expenses was 54310 From about latitude 37° the whole southern portion of his experiments with these metals had not been completely per cent of the receipts, against expenses of 56 2-10 per cent Florida was built up by coral action. It was easy to under successful.

1877.

THE NATIONAL ACADEMY OF SCIENCE.

papers read were : neath.

"Report on the Dredging Cruise of the United States Steamer Blake, Commander Bartlett, during the Summer the submarine plateaus formed by original upheaval of the of 1880," by Prof. Alexander Agassiz; "On the Origin of earth's crust, or by volcanic agency, was next taken up and the Coral Reefs of the Yucatan and Florida Banks," by discussed. Upon the tops of the plateaus thus formed, said New Testament, published in London, and sold at retail for Prof. Alexander Agassiz; "On Some Recent Experiments Prof. Agassiz, lived innumerable colonies of star-fishes and one penny (two cents). Mr. Elliot Stock is the publisher, in Determining the Electromotive Force of the Brush Dy- sea urchins, which left behind, from age to age, their lime- and has sold already 400,000 copies. He expects within a namo-electric Generator," by Prof. Henry Morton; "Meas- stone skeletons. Mr. Murray had calculated from data ob year the sale will number 1,000,000 copies.

the previous year, and of 63 9-10 per cent the year preceding stand from what sources the food supply was derived for Professor Hunt said this process came with the beauty and that, and the cost per message reduced to the average of these submarine island builders. The prevailing winds of force of a revelation; its simplicity recommended it. Every 22 3-10 cents, against 231-10 cents the previous year, 25 cents this region come from the northwest, carrying a current chemist would await further developments with great interthe year preceding that, and 29 8 10 cents the year ending in along with them that floated upon its surface vast amounts est. He also asked what battery power was used. Profesof the sediment of hfe from very distant coasts, and here sor Gibbs said the power of the battery was immaterial, the sediment sank, some of it having traveled from as dis except in point of time. The stronger the power the shorter tant points as the shores of Africa. The current having the time required for the process. With a power equal to a The regular November meeting of the National Academy passed over the Florida projection struck the Yucatan bank, Bunsen battery of 40 or 50 cells he had precipitated 15 of Science began in this city Nov. 16. This meeting is al- and was thence reflected, leaving a large deposit along the grammes of zinc from a solution in from 20 to 25 minutes. ways devoted to purely scientific subjects. Among the margin of the reefs to feed the busy builders engaged be A battery power of two or three cells would probably precipitate 3 or 4 grammes of zinc in an hour.

The manner in which the limestone deposit was laid upon

A Cheap Book.

We were shown the other day a copy of an edition of the