# Srimutit funviam. 

ESTABLISHED 1845.
MUNN \& CO., Editors and Proprietors.
published weenly at
NO. 3'Y PARK ROW, NEW YORK.
A. E. beach. Onecopy, one year, postage included..
One copy, six months, postage included.
Olinbs.-One extra cony of THE SCIEN
Clinbs.-One extra Copy of THE SCIENTI.......................... $1 \mathbf{1} 60$ same proportionate rate. Postage prepaid.
is a distinct paper frien the Scientipic Ambrican. THE SUPPLLEMENT is issued weekly; every number contains 16 octavo pages, with handsome cover. uniform in size with SCIENTIFIC AMERICAN. Terms of subscription
for SUPPLEMENT, $\$ 5.00$ a year, postage paid, to subscribers. Single copies 10 cents. Sold by all news dealers throughout the country. Combined Rates. -The ScIENTIFCC AMERICAN and SUPPLEMENT will be sent for one year, postage free, on receipt of
papers to one address or different addresses, as desired. papers to one address or different addresses, as desired.
The safest way to remit is by draft, postal order, or registered letter.
Address MUNN \& Co . Address MUNN \& CO., 37 Park Row, N. Y. Subscriptions received and single copies of either paper sold by all

VOL. XXXVII., No. 4. [New Series.] Thirty-second Year. NEW YORK, SATURDAY, JULY 28, 1877.


TABLE OF CONTENTS OF
THE SCIENTITIC AMERICAN SUPPLEMENT,
For the week ending July 28, 1877.



## the latest british naval failure.

 A strange fatality seems to attend the vessels of the English navy. For more than two years past accidents and blunders have occurred so repeatedly in the finest and pre-sumably best built ships that the conclusion appears imminent that the superior skill of English ship constructors, engineers, and seamen is fast leaving them. Not long ago the Orontes, a splendid new troop ship, after a highly satisfactory two hours trial of her engines, was sent to St. Helena. Hardly had she started on her voyage than (to quote the Engineer) "the engines broke down utterly, and the ship is now lying disabled in the harbor."
But the hugest blunder of all, if we may credit Mr. E. J. Reed, the late chief constructor of the navy, has been perpetrated in the designing of the famous Inflexible, supposed to be the most powerful vessel of all the English ironclads. She is built on the citadel principle; that is to say, she has a heavily plated central portion wherein are guns, machinery, and magazines. Before and abaft this strong portion the ends are unarmored, it being considered that even if such portions are destroyed in action the fighting capacity of the ship will be none the less. But now Mr. Reed says that if these ends do happen to be destroyed in an engagement, the vessel will not have sufficient stability to stand upright, and in short that she will capsize. On visiting the Inflexible from time to time he found that the unarmored ends were so very large in proportion to the citadel that in order to determine the doubts suggested, he designed an Inflexible in his own office, made all the calculations, and the result he now affirms shows that the destruction of the cork-lined extremities would determine the foundering of the ship. As the Inflexible has been under construction for nearly four years, and as two similar ships have been begun at a cost of about 6 million dollars, John Bull's consternation at reading Mr. Reed's damaging assertions spread forth in the London Times may be imagined. The Admiralty is put upon its defense; but Engineering, after reviewing both sides of the question, admits that the "position of affairs is most serious." This is the second disagreeable truth which Mr. Reed has presented to his countrymen within the last few weeks. The other was that England did not possess an ironclad which could not be promptly destroyed by well managed torpedoes, and that in view thereof the quicker she stopped building enormously costly iron war vessels, the better.

## GLIMPSES OF atlantis.

The sedimentary rocks of our Atlantic States aggregate a a thickness of nearly 45,000 feet. The manner in which the sand, gravel, mud, and so on, which formed these rocks, was distributed over the bed of the sea which rolled where our continent now lies, proves beyond a doubt that they came from the north and east. They represent the detritus of preexisting lands, the washings of rains, rivers, coast currents, and other agencies of erosion; and since the areas supplying the waste could scarcely have been of less extent than th new strata it formed, it is reasonably inferred that land
masses of continental magnitude must have occupied the region now covered by the North Atlantic before America began to be, and onward at least through the palæozoic ages of American history.
It is not to be imagined that the ante-American sea was 45,000 feetdeep. Whenthe earlier palæozoic strata were forming the water was evidently shallow, and in some parts broken by islands. From time to time the sea was deepened by the sinking of its floor; and as the successive strata were laid down the subsidences for the most part more than kep pace with the thickening deposits. Now and again the movement was reversed, as when the Green Mountain range was uplifted; and occasionally deposition exceeded subsidence, or slight elevations brought the sea bed near to the water level. Previous to the carboniferous period evidences of shallow water are common; and after that time successive low-level land areas repeatedly occupied the eastern half of what is now the Mississippi basin.
While the new America was thus forming the ancient At保is was no doubt sinking as well as washing away. Whe its final disappearance occurred remains to be determined quite recently, however, two or three lines of scientific re search seem to converge in support of the truth of the ancient story, long considered mythical, in regard to the geologically recent occurrence of that remarkable catastro phe. Archæo-geology has sufficiently demonstrated that the memory of man runs back vastly farther than history ha been willing to admit; so that there remains no inherent im probability in the story the Egyptian priests told to Solon. All that modern science asks is, whether there is any other evidence of the recent existence of Atlantis.
Since the exploration of the North Atlantic sea bottom for elegraphic purposes proved that no elevations or depressions inconsistent with the safe laying of cables were to be found between Newfoundland and Ireland, it has been popularly taught that the Atlantic lies in a vast trough with a comparatively regular bottom. A wider range of soundings made by the American ship Dolphin, the German frigate Gazelle, the British ships Hydra and Porcupine, and more recently by the Challenger, quite overthrows the popular idea, proving the Atlantic bed to be rather a double trough, the deeper de pressions separated by a mountainous ridge of greataltitude running north and south, almost midway between the exist ing continent. From the variations in the soundings along the ridge there is every reason to infer that it is a line of
broken country, the higher peaks reaching the surface north
of the equator in the Azore Islands, and further south in St Paul's Rocks, the Islands of Ascension, Tristan d'Acunha, etc. On the other side of the ridge the water deepens, the bottom presenting a surface diversified by hills and valleys, such as could be carved out only when the sea bed existed as dry land.
From the soundings made and collated by the officers of the Challenger expedition, a chart has been prepared, show ind by soundings. first, the Atlantic areas having a depth of over 2,000 fathoms, and second, the areas ranging between 1,000 and 2,000 fathoms: the narrower areas having a depth of less than a thousand fathoms, showing white. By far the greater portion of the sea bed south of $50 \mathrm{~N} . \mathrm{L}$. exceeds the depth of 2,000 fathoms. The area of medium depth covers the northern sea down to an irregular line between New foundland and England. Thence a narrow isthmus (begining about $52^{\circ} \mathrm{N}$. L., and $30^{\circ} \mathrm{W}$. Long. from Green wich) connects the northern table land with what has been denominated the Dolphin Ridge-a seal-shaped area with its head to the north and its tail joining (at about $15^{\circ} \mathrm{N} . \mathrm{L}$. and $45^{\circ} \mathrm{W}$ L.) another ridge called the Connecting Ridge. The latter puts out from the South American shore just north of the Amazon's mouth, and extends from about $19^{\circ} \mathrm{N}$. L. and $50^{\circ}$ W. L., southeastward to a point on the equator about Long $10^{\circ} \mathrm{W}$., where it turns abruptly south and forms the Challenger Ridge, which broadens southward, but is not mapped below $40^{\circ} \mathrm{S}$. Lat. Just north of Tristan d'Acunha the Challenger Ridge sends off an arm, which, curving to the northeast, joins the coast of Africa.
Here unquestionably we have the backbone of the ancient Atlantic continent; and in a recent lecture in London one of the Challenger staff has reviewed the evidence of soundings touching the general contour of the " lost Atlantis." Its valleys and hills are not such as could be formed by any natural irregularity in the deposition of sediments, nor by submarine elevations; they have been carved by agencies acting above the water level. Along the ridge there are four points which remain unsubmerged-the Azores, St. Paul's Rocks, Ascen sion, and Tristan d'Acunha. In the deeper basins, the Ber mudas, Fernando de Noronha, Trinidad, and St. Helena rise to the surface, in some instances not far distant from depths exceeding 3,000 fathoms. A group of such soundings under the equator (not far from where the general ridge makes the angle separating the Connecting Ridge from the Challenger Ridge) give evidence of an ancient valley line. Supposing the continent raised until this valley became dry land, the high peaks (now islands) near by would rise to Himalayan heights, and the ridge itself would average about 1,500 feet. Even under the eqnator such elevations would be capped with snow, if the atmospheric conditions were at all as now. The lower levels along the mountain ridge would present every variety of climate, according to the height; and with such a line of communication many serious problems of plant and animal migrations across the equator during the seologic ages could be easily solved. In the North Atlantic regions the general elevation of the ridge is probably not more than 9,000 feet, unless the original depths are masked considerably by a deposit of globigerina-ooze.
Thus deep sea exploration confirms the report of geology that Atlantis really existed; and palæontology also bears wit ness to the same great fact. Still more, it testifles that the final disappearance of the buried ridge did not occur until comparatively recent times. The evidence on this point was reviewed some eight years ago by Professor Unger, who had been led to believe that a land connection must have existed between Europe and America, as late as the tertiary period, by a comparison of the recent and fossil floras of the two continents. Other evidence of like nature may be found in Professor Gray's review of the history of the gigantic red woods (sequoias) of California, reprinted in "Darwiniana."
With such support the traditions of the ancient world, on both sides of the Atlantic, begin to read like something more than empty myths. The Egyptian priests, it is more than likely, were reciting veritable history when they told Solon about the islands of continental magnitude that formerly ex isted in the outer sea beyond the pillars of Hercules, but had sunk beneath the waters. And it is not impossible that the mighty kings of Atlantis may have invaded Europe and Africa, as the Esyptian books narrated, and overrun thos countries as far as Greece and Egypt.
The story of the sinking of Atlantis during a time of floods and earthquakes was preserved with even greater fulness of detail on the American continent, if there is any truth in the representations of Brasceur de Bourbourg. That student of Central American monuments and traditions asserts that not only was the story of the submergence of a great country to the eastward widely spread among the natives and frequently referred to in their writings, but that seasons of humiliation and prayer were observed in commemoration of such disas-ters-both princes and people humbling themselves before heir divinity and praying that the calamities which had overtaken their ancestors might never be repeated. These great convulsions are specially dwelt upon in the Indian traditions, and one or two minor ones are mentioned, when the and was shaken by frightful earthquakes and the waves of the sea combined with volcanic flres to overwhelm and engulf t. By these convulsions the land was swept away and submerged, but few of the inhabitants escaping in boats or finding a refuge on the tops of high mountains.
To the evidence of tradition de Bourbourg adds that of language. The words Atlas and Atlantic, he says, have no satisfactory etymology in any language of the Old World. On the other hand, the radicle atl is characteristic of the

