

SCIENTIFIC AMERICAN

ESTABLISHED 1845

MUNN & CO., - - Editors and Proprietors

Published Weekly at

No. 361 Broadway, New York

TERMS TO SUBSCRIBERS

One copy, one year for the United States, Canada, or Mexico \$3.00
 One copy, one year, to any foreign country, postage prepaid. £0 16s. 5d. 4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845) \$3.00 a year
 Scientific American Supplement (Established 1878) 3.00 "
 Scientific American Building Monthly (Established 1883) 2.50 "
 Scientific American Export Edition (Established 1878) 3.00 "

The combined subscription rates and rates to foreign countries will be furnished upon application.

Remit by postal or express money order, or by bank draft or check.

MUNN & CO., 361 Broadway, New York.

NEW YORK, SATURDAY, DECEMBER 26, 1903.

The editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

PROPOSED NEW PATENT OFFICE BUILDING AT WASHINGTON.

It is a notorious fact that the present Patent Office building at Washington is quite inadequate to accommodate the growing business of the Patent Office Department. Not only so, but for a great number of years it has been necessary to find for a large amount of documentary and other material of priceless value temporary, makeshift quarters. The present building is not of fireproof construction, and it needs no multiplication of words to prove that the records of such an important institution as this should be stored where they are entirely protected from damage or absolute loss. Furthermore, the congestion of records is not the only disadvantage under which the lack of accommodation places the department, for one has only to read the annual reports of the Commissioner to be convinced that the work of the general staff has been rendered doubly onerous, and is to a certain extent delayed, by the uncomfortable crowding of the past few years. Year by year an urgent appeal has been made for the amelioration of the present conditions; but for reasons which it is difficult to exactly determine, Congress, while acting with lavish liberality toward some other institutions of far less national importance and merit than this, has so far shown no disposition to move in the matter.

The subject is once more about to be brought to the front by the introduction of a bill which will deal with the proposition in a very comprehensive manner. It is proposed to purchase the large lot of ground lying to the east of the Capitol, and located between East Capitol and B Streets, North, and between First and Second Streets, and erect thereon a monumental fireproof building at a cost of five million dollars, which shall harmonize in architecture with the adjoining Library of Congress, and shall match it in size and dignity. A magnificent square would thereby be provided, with the Capitol on one side and the Library and Patent buildings opposite. The building is to contain suitable offices for the accommodation of the Commissioner of Patents and the working force of the Patent Office, suitable rooms for the storage of records and other documentary matter, and a great "Hall of Inventions," for the display of models and designs of inventions and for their arrangement as far as may be on historical lines, so as to constitute a concrete record of the evolution and development of invention in the United States. The building, as thus erected, will bear to invention the same national relation as the present magnificent Library does to literature. The proposed plan has been submitted to the committee that has in charge the ambitious scheme for the general landscape and architectural beautification of Washington, and has received their unqualified endorsement. Indeed, such a structure would form one of the most important architectural elements in that scheme, and by its erection the United States as a nation would give worthy recognition in their capital city to invention—a field of human activity in which, perhaps more than in any other, the United States is held, and justly held, to be pre-eminent among the nations of the earth.

Moreover, there is at the present time over five million dollars to the credit of the Patent Office in the Treasury.

BRUNEL AND THE "GREAT EASTERN."

The fascinating interest which will always attach to the "Great Eastern" has been greatly stimulated by a recent paper read by Sir William White, the new President of the British Institution of Civil Engineers. It would be difficult to find an authority better qualified to discuss the technical merits of Brunel's great ship, for Dr. White was the designer of practically the whole of the great British fleet as it floats to-day; many of our own naval designers, including Rear-Ad-

miral Bowles, the late chief constructor of the navy, have studied under him; and no naval architect of the last thirty years has left so profound a mark upon the theory and practice of naval construction. The estimate of the merits of the "Great Eastern" formed a part of an exhaustive review of marine shipbuilding and engineering during the half century or more covered by the professional life of the speaker, and so important was the part played by this famous ship that a great part of the address was devoted exclusively to this subject.

It was at the close of the year 1851 that Brunel began to study the problem of constructing a vessel that could carry sufficient coal for a voyage to Australia and back and provide accommodation for a large number of passengers and a certain amount of cargo. Although he sought advice and assistance in all quarters, it is clear that all the leading features of the design—that is, the structure, propelling machinery, and determination of dimensions—were his own. Dr. White states that he has been familiar with the facts for many years, and that he has recently gone once more, most carefully, through Brunel's notes and reports, with the result that his admiration for the remarkable grasp and foresight displayed has been greatly increased. In fact, Brunel displayed a knowledge of principles such as no other ship designer of his day seems to have possessed, and in proof of this, reference is made to the provision of ample structural strength with a minimum of weight; to the increase of safety by watertight subdivision and cellular double bottoms; to the design of special propelling machinery and boilers with a view to economy of coal and wide radius of action; and to the selection of forms and dimensions likely to minimize resistance and produce a vessel that would be easy in a seaway.

We receive from time to time so many queries as to the exact dimensions of this vessel, that we take this opportunity of repeating the correct figures as taken by Dr. White from Brunel's notebook: The length over all was 693 feet, and between perpendiculars 680 feet; the extreme breadth of hull was 83 feet; the breadth over the paddle boxes, 120 feet, and the depth of the plated hull was 58 feet. The "Great Eastern" could steam at 14 knots an hour and had accommodations for 3,000 people. Compare these figures with those of the most powerful Cunard steamers of that time, which were only 285 feet in length. Nearly half a century elapsed before these dimensions were surpassed by the launch of the "Oceanic," which is 704 feet in length over all. The lines of the hull were drawn by Scott Russell, and they were based upon his well-known wave-line theory. It is evident from Brunel's notes that the estimate for engine power to obtain the desired speed of 14 knots was made by Brunel in conference with Russell. Dr. White makes the significant statement that having carefully looked into the matter in the light of personal knowledge, he is of the opinion that the estimate of power required to drive the "Great Eastern" at 14 knots on an average draft of 25 feet, is practically identical with that which would now be made for the ship if propelled by twin screws—a very remarkable result, when we bear in mind the enormous size of the "Great Eastern" in comparison with any other steamer at the time she was designed.

Furthermore, the structure of the "Great Eastern" was not merely a marvel, but considering the date of her construction it is still, in the judgment of the late chief constructor of the British navy, a most fruitful and suggestive field of study. Brunel was a bridge builder, and he carried the principles of bridge design into his ship. To him a ship had always been a girder from the time when he designed the "Great Western." In the "Great Britain," an iron ship, he introduced new structural arrangements; and that vessel did good work for forty years as a steamer; was then converted into a sailing ship, and finally did duty as a hulk in the Falkland Islands. When he began work on the "Great Eastern" he laid down the principle of construction "that no material shall be employed on any part, except at the place and in the direction and in the proportion in which it is required and can be usefully employed for the strength of the ship, and none merely for the purpose of facilitating the framing and first construction." The "Great Eastern" fully vindicated the structural theories of her designer. She carried enormous loads of submarine cables; passed without structural injury through severe storms; a gaping hole, 10 feet broad and 80 feet long, was torn by the rocks off Montauk Point through her outer skin, yet she reached New York without her passengers being aware of the damage done. In concluding his address, Dr. White sums up with the startling statement that he has most thoroughly investigated the question of the weight absorbed in the structure of the "Great Eastern," and that his conclusion is that it is considerably less than that of steel-built ships of approximately the same dimensions and of the most recent construction. After making full allowance for the greater speed, more powerful engines, and heavy superstructure of large modern passenger ships, it is

concluded that the "Great Eastern" was a relatively lighter structure, and this in spite of the fact that at the time she was built only iron plates of very moderate size were available and that the plates used for the outer and inner skin were only three-quarters of an inch in thickness.

SOME EARLY SUBSCRIBERS HEARD FROM.

At the present season of the year, when our old subscribers send in their renewals to the SCIENTIFIC AMERICAN, the Editor receives a large number of letters which contain ever-welcome criticisms of the year's work; suggestions as to the future; and more often than not, a reference to the early acquaintance of the writer with our journal, and the period of years for which he has been a reader or subscriber. Many of the dates mentioned are so remote, so close to the year 1845, in which the first issue appeared, that the Editor decided to request those who considered themselves to be probably among the earliest subscribers, to give him the facts concerning their first connection with the paper. As a result, he has before him what must surely be one of the most unique, and in some respects one of the most pathetic, batch of letters that ever reached an editorial desk. No more convincing evidence of the genuine nature of these replies could be asked than the evidence of age that is shown in the faltering chirography of some. Of those who took the trouble to write, it is found that six have been continuous subscribers for a period of fifty-nine years, or from the very year in which the paper was started, while two others commenced their subscription in 1846, four in 1847, and two in 1849. Fourteen of our correspondents were entered on our lists during the five years from 1850 to 1855, and fifteen more date back to the period 1855-1860. In addition to these enumerated, we have received a host of answers from subscribers who have been taking the SCIENTIFIC AMERICAN continuously for periods of from twenty-five to forty-five years. Limitations of space forbid any extensive quotation from letters which could not fail to be of the greatest interest to our readers; but instead we publish in full a letter which comes to us unsolicited, and which is as welcome as it was unexpected. The Editor should be pardoned for any seeming immodesty in publishing a letter so full of good will and encouragement. The author is a well-known engineer, and was for several years the editor of a high-class technical journal in New York city. He writes as follows:

"After an intimate acquaintance with the SCIENTIFIC AMERICAN for over half a century as man and boy, I must say that, like wine and old friends, it improves with age. It has never made so good an appearance or held such a firm grip upon matters within its field as at the present time. It has a most useful versatility, and covers popular science and practical, everyday engineering without pedantry or 'words of learned length and thundering sound;' so that if a man is compelled to run, metaphorically, to keep up with the improvements of the time, he can read as he goes. If a young man is confined to one paper, for any reason at all, that one should be the SCIENTIFIC AMERICAN. It is a compendium of all that is really valuable in the trades and sciences as they are followed to-day. While I am not without a certain familiarity in the subjects covered by it, I am happy to say that there is not a single issue which I take up, wherein I do not find something which leads me to abandon views formerly held, and subscribe to the better way, the brighter light held by my lifelong friend—the SCIENTIFIC AMERICAN."

A CONVENTION ON MOSQUITO EXTERMINATION.

It seems a novel undertaking to hold a convention for the purpose of discussing the best methods of mosquito extermination and prevention.

But a very large number of persons responded to the call at the first public meeting held on this subject in this city on December 16, 1903, at the Board of Trade rooms on Broadway, corner of Fulton Street.

The meeting was to have been presided over by Hon. Franklin Murphy, Governor of New Jersey, but he was unable to attend. Hon. Robert W. De Forest, one of the vice-presidents, presided instead. The meeting was called to order by Mr. Henry Clay Weeks, who explained the object of the convention and its purposes. He was elected secretary and Mr. William J. Matheson was chosen treasurer. A permanent national organization was provided for, for the promotion of the object.

There was much interest manifested, and several papers were read on the different phases of the mosquito problem.

Among the papers were: "The World-wide Crusade," by Dr. L. O. Howard, of the Agricultural Department at Washington, D. C.; "The Sphere of Health Departments," Ernst J. Lederle, Ph.D., president of the Department of Health, city of New York; "The Work of the United States Public Health and Marine Hospital Service," Passed Assistant Surgeon J. P. Perry; The Determination of Marsh Soil Surveys," Prof. Milton