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## SCIENTIFIC AMERICAN SUPPLEMENT

## No. 589

**For the Week Ending May 1, 1886.**

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### INVENTIONS WANTED IN INDIA.

The present industrial requirements of India is the subject of a very interesting communication received from an esteemed correspondent in Calcutta, whose position as proprietor of a large tea estate has given him an excellent opportunity for observation. His suggestions will be of interest to American inventors, as they point out new fields for the application of that ingenuity which has already given to American inventions such an enviable pre-eminence in the markets of both hemispheres. After a long period of apparent mechanical inertia, India is now evincing a progressiveness which will make her a country whose acquaintance it will be very desirable to cultivate. As her resources are still largely agricultural, one of the first demands is for improved farming tools and appliances. In tea culture, improved machines for rolling the leaf after withering, for firing, sorting, and sifting, are in demand, and would be heartily welcomed by many planters. In handling silk, a great disadvantage is at present experienced from the difficulty of producing an even thread. The fiber of the native silk is excellent, but the manipulations which it subsequently undergoes are so imperfectly performed that the product comes out an inferior article. India, it will be remembered, is the old home of the sugar cane, and improved crushing machinery finds ready market. One firm alone makes over a hundred thousand dollars annually in royalties from its patent mill. The indigo industry has been brought to considerable perfection, though there is still room for improvement in the chemical and mechanical manipulations. In addition, there are large amounts of crude products, such as oil seeds, jute, and cotton, which are exported, but which could be worked up at home to good advantage were suitable manufacturing processes available.

As all of these industries require large quantities of worked timber for boxes, buildings, carts, tool mountings, etc., there is an excellent market, our correspondent adds, for woodworking machinery. In many parts of the empire there are valuable forests, but the lack of sawmills prevents them from being utilized. The demand is particularly for portable machines which can be conveniently moved from place to place as demand and timber supply require. The mining implements of India are still very primitive, though the development of the petroleum industry has created a demand for improved boring tools. Steam launches and barges are coming into more general use, and considerable progress is shown in this direction. The railways have effected a marked mechanical advance. They now manufacture their own locomotives and most other appliances for railway service. We might enumerate many other departments from our correspondent's lengthy and carefully compiled notes in which this spirit of progressiveness is manifest, but we have probably said enough to convince American inventors that there is already a field in India in which to extend the success achieved at home, and it is a field the importance of which is annually increasing. Our correspondent thinks our manufacturers, exporters, and inventors will be unwise if they overlook India in their pursuit of new avenues for the distribution of their merchandise and the introduction of useful machinery and patent appliances.

The patent laws of India are liberal toward the inventor, and protection is as readily accorded there as in other countries; and with steam communication between England and India as regular as the boats ply between New York and Fall River, to which add the telegraph, India is no longer an "out of the world, barbarian country."

### THE AMERICAN MUSEUM OF NATURAL HISTORY.

We want to call the special attention of our readers to Mr. Gratacap's very interesting description in the SCIENTIFIC AMERICAN of April 17 of the more prominent specimens to be found in the paleontological department of the American Museum of Natural History at Central Park, New York. We believe that the institution is not as fully appreciated and used as it should be, because it is not very well known to the public.

We are sure that a great many more people would avail themselves of its treasures if they only knew how much there is there to claim their interest. And a word in regard to our illustrations. We have, it is true, built up an ideal picture in order to present more vividly those extinct organisms which once inhabited the land and sea, but our artist has not drawn upon his imagination for even the slightest detail. Both fauna and flora are exact reproductions of the actual specimens, just as the hand of Nature inclosed them between the limestone and sandstone pages of her great geological history.

The Museum is located on Eighth Avenue, at the corner of Seventy-seventh Street, on the west side of the Park, and is easily reached by way of the Sixth Avenue elevated railroad. It is open for free inspection, and contains so much of interest in its collections of minerals, fossils, natural history specimens, native woods, etc., that we are confident any and all of our readers, whether particularly scientific or not, must feel well repaid for the trouble of a visit by the pleasure of a careful examination. We hope that the educational importance of the collection will in the future be better understood and appreciated.

### NATIONAL ACADEMY OF SCIENCES.—ANNUAL MEETING AT WASHINGTON.

The regular annual meeting of the National Academy of Sciences was held at the Smithsonian Institution, April 20 and for several subsequent days, President O. C. Marsh in the chair. (See portrait on another page.)

The attendance of members was the largest ever known in the history of the Academy, including the following: Cleveland Abbe, Spencer F. Baird, George F. Barker, A. Graham Bell, John S. Billings, W. K. Brooks, John H. C. Coffin, Edward D. Cope, Clarence E. Dutton, William Ferril, Grove K. Gilbert, Theodore N. Gill, Arnold Hague, Asaph Hall, Julius E. Hilgard, George W. Hill, T. Sterry Hunt, Samuel P. Langley, Alfred M. Mayer, Montgomery C. Meigs, Henry Mitchell, S. Weir Mitchell, Edward S. Morse, Simon Newcomb, H. A. Newton, A. S. Packard, John W. Powell, Raphael Pumpelly, Ira Remsen, Ogden N. Rood, Henry A. Rowland, Charles A. Schott, Samuel H. Scudder, William Sellers, Sidney I. Smith, Arthur W. Wright, and Charles A. Young.

The session was especially signalized by the conferring of the first medal ever awarded by the Academy—the Henry Draper gold medal, of the value of $200, placed at the disposal of the Academy by the widow of the late Henry Draper, and awarded by a committee of the Academy for the best original researches in astronomical physics.

The award was not restricted to the limits of the Academy, but was to go to the most successful discoverer in all the world. After careful consideration, the committee reported that it was best deserved by a fellow member, Prof. Samuel P. Langley, of the Allegheny Observatory, for his researches into the wave lengths of light in the infra-red and ultra-violet portions of the spectrum.

In presenting the medal, President Marsh gave a synopsis of Prof. Langley's scientific researches, extending over the last fifteen years. In 1869 he observed the solar eclipse, and again in 1870, going to Spain the latter year. In 1875 he demonstrated the absorption of violet rays by the sun's atmosphere. In 1876 he studied the distribution of heat on the sun, and the limits within which sun spots affect climate, proving that they cannot make a difference of 1° Fah., and continued investigations of solar heat and its effect upon the earth for several years following. In 1878 he investigated the solar spectrum from Pike's Peak, and showed that the rays of the "great group A" were double. In 1881 he carried out the expedition to Mount Whitney, and ascertained that the amount of the sun's heat had previously been greatly underestimated. He increased the estimate 50 per cent. He also determined the fact that the sun is blue, and that the white light which we see is only the remnant sifted out by the selective action of the sun's and the earth's atmosphere. In 1882 he invented the bolometer, which enabled him to study with a degree of precision not theretofore attainable the undulations of long wave lengths below the visible red end of the spectrum. In 1884 and 1885 he applied this instrument to the study of terrestrial absorption and of the radiation of heat from the moon.

In 1885 and 1886 he prosecuted researches far into the infra-red region of the spectrum, discovering in terrestrial and lunar radiations undulations much slower than have been detected in the spectrum of light direct from the sun. Sir Isaac Newton had only succeeded in detecting waves of 0·00004 to 0·00007 millimeter in length, and in the two centuries since his time subsequent observers were able to extend the investigation only to 0·00010 m.; whereas, since the invention of the bolometer in 1882, Langley has demonstrated undulations of the length of 0·004 m., being a range forty times as great as all other investigators had covered in the two centuries preceding.

Two other medals of the same value are to be hereafter awarded by the Academy—the Watson medal, for original research in another department of astronomy, and the Lawrence Smith medal, for original discovery in meteoric bodies. The Watson medal has been awarded to Professor B. A. Gould, and will be conferred next year. The brilliant and instructive studies of Professor Hubert A. Newton, of Yale College, point to him as evidently the most conspicuous candidate for the honor of the latter medal.

The papers read at this meeting have been of high value, both scientific and utilitarian. Professor Langley presented results of his studies on invisible spectra. He said that most of the region of the spectrum from which energy comes to us is unknown. We have in the ultra-violet rays one hundredth part the amount of energy which comes from all the rest of the spectrum, and our investigations therefore have merely touched this region. This is due to the fact that these rays will not pass through glass, and rock salt, the most available medium, is difficult to work.