

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors. PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK. A. E. BEACH.

O. D. MUNN.

TERMS FOR THE SCIENTIFIC AMERICAN

Remit by postal or express money order, or by bank draft or check MUNN & CO., 361 Broadway, corner of Franklin Street, New York

The Scientific American Supplement

THE SCIENTIFIC AMERICAN Supplement is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, 55.00 a year, for the U.S., Canada or Mexico. 45.00 a year to foreign countries belonging to the Postal Union. Single copies, 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page. Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, to one address in U.S., Canada or Mexico, on receipt of seven doilors. The foreign countries within Postal Union, dight dollars and fifty cents a year.

Building Edition.

Building Edition. THE ARCHITECTS AND BUILDERS EDITION OF THE SCIENTIFIC AMERI-CAN is a large and splendid illustrated periodical, issued monthly, con-taining floor plans, perspective views, and sheets of constructive details, pertaining to modern architecture. Each number is illustrated with beautiful plates, showing desirable dwellings, public buildings and archi-tectural work in great variety. To builders and all who contemplate build-ing this work is invaluable. Has the largest circulation of any architec-tural publication in the world. Single copies 25 cents. By mail, to any part of the United States, Canada or Mexico, \$2.50 a year. To foreign Postal Union countries, \$3.00 a year. Combined rate for BUILDING EDITION, SCIENTIFIC AMERICAN, to one address, \$5.40 a year. To foreign Postal Union countries, \$11.00 a year. PLEMENT, \$3.00 a year. To foreign Postal Union countries, \$11.00 a year.

Spanish Edition of the Scientific American. Spanial Edition of the Scientific American. LAAMERICA (ENTIFICA E INDUSTRIAL (Spanial trade edition of the SCIENTIFIC AMERICAN) is published monthly, uniform in size and typo-graphy with the SCIENTIFIC AMERICAN. Every number of La America is profusely illustrated. It is the finest scientific, industrial trade paper printed in the Spanish language. It circulates throughout Cuba, the West Indies, Mexico Central and South America, Spain and Spanish posses-sions-wherever the Spanish language is spoken. \$3.00 a year, post paid to any part of the world. Single copies 25 cents. See Prospectus. MUNN & CO., Publishers, 361 Broadway, New York

(37) The safest way to remit is by postal order, express money order, draft or bank check. Make all remittances payable to order of MUNN & CO. 197 Readers are specially requested to notify the publishers in case of any failure delay, or irregularity in receipt of papers.

NEW YORK, SATURDAY, FEBRUARY 11, 1893.

Contents.

(Illustrated articles are marked with an asterisk.)

Armor plate, American, tried in Eugland	Incandescent lamp, Edison, at- tacked
Hawaiian Islands annexation	

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 893.

For the Week Ending February 11, 1893.

Price 10 cents. For sale by all newsdeale

PAGE 1. A RCHITECTURE.—Luther's Church in Wittenberg.—Therecent-ly restored church commemorative of Luther.—Other architec-tural objects connected with the memory of the same.—6 illustra-tions. . 14270

- IV. CIVIL ENGINEERING.—Revolving Grand Stand.—A curious suggestion for application to race tracks.—A floating grand stand. urgestion for approximation to the second se 14266 drill, with numerous . 14266
- VI. HYGIENE.—Color Vision.—A report presented to the Royal British Society by a committee on color vision.—Interesting con-clusions reached after the labors of the committee.
 Will the Coming Woman Lose Her Hai?—By Miss E. P. An-DREWS.—Rareness of actual balances in women and its frequency in men.—A curious statement of the scientific aspect of the case 14269

revolution. The country is now in the hands of a pro- their amiable qualities is easily found. visional government who have deposed the queen, and b On April 4, 1820, seven American missionaries reached of the hour. Some advocate annexation to the United the islands, so as to have one more stepping stone for yet developed to any great extent.

to freckle, and by their facial contour, which is Cau- general feeling on the island is said to be opposed to casian. They are termed Kekea. The true discovery Great Britain. Hawaii, is now in the ascendancy and will, it is to be hoped, remain so.

A very elaborate system of feudal government originally obtained there, five or six independent monarchs holding sway. Wars were frequent. In one of them, in 1790. King Kamehameha was attacked by another king, and defeated the aggressor. He pursued his conquest and thirty years later was sole monarch of the pounds per annum.

> нлшлилт ٠, Ċ 27 74.013 0 Maste

islands. The dynasty thus founded lasted until December 11, 1872. A chief, Lunalilo, was elected to succeed this house. On February 12, 1874, Kalakaua was elected king. He died in 1891, while visiting this country. His sister, the recent queen, Lilioukalani, the widow of John O. Dominis, the latter of American origin, succeeded him. She is the deposed ruler. Undoubtedly no native dynasty will again hold sway.

In the history of the country, which history is one tale of revolutions, some facts bearing on annexation may be noted. In 1810 Kamehameha I. wrote to George III. of England, desiring formally to acknowledge the British king as his sovereign and to place the islands under his protection. The offer, it is said, was accepted. Again, in 1843, a provisional cession of the islands to Great Britain is recorded, which was abrogated a few months later. By special treaty of 1889 the control of foreign relations was given to the harbors among the islands are very few. United States.

6,400 square miles, over three times that of the State pal reasons cited against annexation. It would virtuof Delaware, or about four-fifths of that of the State ally represent a price paid for the islands. of Massachusetts. One island, Hawaii, contains 4,000 square miles. Most of the rock formation is volcanic. On Hawaii are two active volcanoes-Kilauea and

THE HAWAIIAN ISLANDS AND THEIR ANNEXATION. features. Capt. Cook's death is believed to have been Some two thousand miles from San Francisco in a precipitated by his own cruelty and hypocrisy. The southeasterly direction lies the group of the Ha-American whalers used to recruit their crews with waiian Islands, which have been the scene of the late Kanakas, as the natives were called, and tribute to

the future disposal of the government is the question the island. Shortly before this time the natives had destroyed all their idols, and the missionaries found a States. Great Britain would be hardly true to her nation without any religion. In 1825 the ten comnature did she not contemplate taking possession of mandments were adopted as law by the government. The first missionaries reduced the language to a writthe sun, which always shines on some part of her do-ten form, with an alphabet of twelve letters a, e, i, o, iminions. Germany's interest in the islands has not u, h, k, l, m, n, p, w. Whether the limited alphabet has anything to do with it may be a matter of surmise, About the year 1527 one or two Spanish ships were but the population is said to be on the average less wrecked upon the islands, and the few survivors inter- illiterate than that of New York City or Pennsylvania. married with the natives. Their descendants are iden-1 It is claimed that they have a well settled American tified to the present day by their light skin, liability society, comparable to anything in the States. The

of the islands was effected in 1542 by Gaetano, a Spanish Last autumn the San Francisco Examiner had a navigator, and in 1567 Mendana, another Spaniard, poll taken of the Hawaiian parliament on the subject determined the true position of one of the islands, of annexation. The sentiment then was strongly in Kauai. In the beginning of 1778 Captain Cook visited favor of independence. The queen's leaning toward the islands, whence his countrymen assign to him the absolutism is largely responsible for the revolution and honor of discovery. He left them and returned toward presumable change of views of the leading men on the end of the year. He excited the hostility of the annexation. Probably the sugar question is one of natives and on February 14, 1779, was killed by them the factors at the bottom of it. At one time the sugar on the shores of Kealakeakua Bay, on the island of plantations paid a return of some fifty per cent on the Hawaii. He was endeavoring to recover a stolen boat investment. This state of things has been done away when killed. The name Sandwich Islands is derived | with by free West India sugar, so that a far smaller from Lord Sandwich, of England, and was given by profit is made. The hopes of a bounty per ton of Captain Cook. Fortunately the beautiful native name, sugar is one element making the sugar planters anxious for annexation.

> Practically Hawaii draws upon San Francisco for her supplies. In 1891 the tonnage of American ships entering the harbor of Honolulu was over three times that of English ships, or 173,891 tons. American imports aggregated \$5,924,277, as against \$1,201,329 of British imports. The sugar production is now 300,000,000

> The leper colony on the island of Molokai, the scene of the heroic exertions of Father Damien, casts a shadow over a picture where there is so much that is fair. But Canada and Louisiana both have had lepers for many years : so in leprosy we would have no new acquaint. ance. Some thousands of miles to the south and east of Hawaii, Robert Louis Stevenson has established himself. But his lovely Samoa hardly vields to the charms of the more northerly group of Hawaii. The varied climate enables any form of vegetation to be raised that can be grown in a temperate or tropical climate. The establishment of a botanical garden, absolutely unique in the world's history, would be an interesting possibility. The islands are but six days from San Francisco, and by fast steamers could be brought much closer. Under proper conditions, they might attract and should attract many tourists. The fact that America is by far the nearest mainland seems to bring the islands within the operation of the Monroe doctrine, and goes to forbid the establishment there of a European power. The purchase of Alaska, under the advice of Seward, when United States Secretary of State, has proved an excellent operation for this government. The annexation of Hawaii, it may be believed, would prove in its degree equally good for us, and, it is to be hoped, would be good for the inhabitants also. As a touching point for ships, its value cannot be overestimated. In war the importance it would acquire, as a strategetical point, and as a depot for coal and supplies for war ships, is obvious. We already possess by treaty, rights in a species of harbor or coral lagoon, Pearl Harbor by name, which requires dredging before it will be available for ships of war. The bay of Honolulu, on the island of Oahu, is the principal harbor. It has 22½ feet of water. Good

The islands now have a debt of \$3,000,000. The The islands are twelve in number, with an area of necessary assumption of this debt is one of the princi-

> THE EDISON INCANDESCENT LAMP PATENT ATTACKED

in men.—A curious statement of the scientific aspect of the case. 14276	On Hawan are two active volcanoes—Khauea and	ATTACAED.
VII. MATHEMATICS.—Multiplication Simplified.—By NICHOLAS J. VANDER WEYDE.—A suggestion for a new style of multiplica- tion.—Suggested to supersede the old style in the schools of this country.—Its advantages and examples of its application	Mauna Loa. Between the effects of eruptions and ac- companying earthquakes a number of lives have been lost. The highest point in the islands is Mauna Kea.	History repeats itself. Some years ago the great Bell telephone patent had arrayed against it a host of witnesses and able legal and expert talent. In the
♥1Π. MICROSCOPY.—Staining Vegetable Tissues.—Several meth- ods of staining microscopic objects and sections, with formula 14278	on Hawaii, which rises to an elevation of 13,805 feet	
IX. MINING ENGINEERING.—The Gold Fields of Maine.—Practi- cal results in gold mining in Maine and history of the discovery of these deposits	With such an immense range of altitudes, a great	operation a telephone and microphone antedating Bell and Hughes by many years. The case went to
X. NATURAL HISTORY.—The Brine Shrimp of the Great Salt Lake.—By J. E. TALMAGE.—An interesting little crustacean and its habits	frosty weather to very warm weather throughout the	
XI. ORDNANCEWorthless Rifles in the erman ArmyThe trial of Loewe & Co., for guns supplied to the German army1 illus-	to temper excessive heat. In the winter heavy rain-	Circuit Court in this city. The usual course was taken after an adverse decision in the lower court,
tration	The natives are supposed to be of the Malay race.	but the appeal was without result. It was chiefly re- markable for the division of opinion of the United
XII. PHYSICS.—Osmotic Pressure.—By J. W. RODGER.—Recent in- vestigations under improved conditions in the law of osmosis.—A full discussion of results	lation was about 300,000. War and disease, the con- comitants of civilization, have reduced the population,	
 XIII. SEISMOLOGY.—On the Cause of Earthquakes—By the Rev. H. N. HUTCHINSON.—How earthquakes do their destructive work, how they are caused, and what they are.—1 illustration 14275 	which but 34,436 were of the aboriginal race. It is	Bell patent in any case would relegate it to obscurity. Now the electric light has found its Drawbaugh.
XIV. TECHNOLOGY.—The Manufacture of Liquors and Preserves. —By J. DE BREVANS.—Liquors, rataflas, with many formulæ.—1 illustration14278		Heinrich Goebel, born near Hanover in Germany, is the inventor cited to destroy the recently affirmed