

# Scientific American.

ESTABLISHED 1845

MUNN &amp; 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 1876)..... 3.00 "  
 Scientific American Building Edition (Established 1885)..... 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 &amp; CO., 361 Broadway, corner Franklin Street, New York.

NEW YORK, SATURDAY, FEBRUARY 24, 1900.

## REVIVAL OF THE SECOND-CLASS MAIL MATTER QUESTION.

It is surprising with what persistency fallacies of legislation, which we thought had been forever laid to rest, will ever and again rise from the dead, and strut, very much alive, through the halls of Congress. As between the orthodox ghost and the shades that haunt the assemblies in which the laws of the country are made, there is this difference: that whereas the former has certain clearly defined characteristics in the way of an elusive personality, clinging ceremonies, and a redolence of the vault and the mausoleum, these legislative ghosts will vary in shape, size, and character according to the idiosyncracies of the bill in which they are clothed for presentation to Congress.

The latest resurrection of exploded theories has taken place in the House of Representatives, and, under the personal management of Mr. Loud, the chairman of the Committee on Post Offices and Post Roads. Mr. Loud is a man with an idea, who for several years past has been trying to persuade Congress to enact that idea into law. Mr. Loud has several other ideas, subsidiary to the central one, and they all relate to the conveyance of second-class matter through the mails. While some of them are harmless, or mildly beneficial, others are decidedly retrograde and pernicious, and, if passed into law, would seriously curtail the usefulness of that splendid institution known as the American Press.

The first provision of the bill, to prohibit sending as second-class matter "publications purporting to be issued periodically and to subscribers, but which are merely books or reprints of books," is, we think, a good one. It is aimed at those publishers who, by splitting a book into sections and mailing these sections without bindings and apparently in second-class form, seek to circumvent the law by mailing third-class matter at second-class rates.

Having said this much in favor of Mr. Loud's bill, we find little else that is not earnestly to be deprecated both by the publisher and public. In the first place, it involves the vicious principle of *local disqualification*, by establishing a zone system of charges for carrying periodicals, under which the rate is to be one cent a pound for the first one thousand miles and two cents a pound for distances exceeding one thousand miles. This would involve a local discrimination in favor of central cities like Chicago and St. Louis, most of whose mailing distances would be within the zone, and against coast cities like Philadelphia, New York and San Francisco, a large portion of whose second-class matter, being sent beyond the zone, would be charged double rates.

Apart from the question of local injustice, the bill is to be condemned as a return to an old system that was in vogue in the early days of the Post Office and was long ago abandoned for the present system of one price for all distances. We thought it was pretty well understood that the introduction of "penny postage" had proved to be the most far-sighted and beneficial reform in the history of the Post Office. Mr. Loud evidently does not think so, and in the unlikely event of his zone system for second-class matter becoming law, we might reasonably look for a further bill to include first-class matter as well.

If it is well to tax distance on a newspaper, why not on a letter?

It is little wonder that the Post Office Department, which surely should be well informed as to the value of any proposed changes in its laws, is opposed to the zone system as being retrograde in its spirit and impracticable in its operation. For the existence of a zone system implies that not merely the postmasters but practically every citizen who uses the mails must be aware of the distance from every post office in the United States to every other office, a supposition that is as ridiculous as it is impossible.

The author of this perennial bill, which is startlingly varied in its present presentation by the addition of a zone tariff, is surely little acquainted with the mail-

ing department of a great daily or weekly newspaper, or he would never have inserted a clause requiring "publishers . . . before depositing second-class matter in the Post Office to separate the same into United States mail sacks or bundles, by States, cities, towns and counties, as the Postmaster-General may direct." If the public is to perform one part (and no small part) of the duties of the Post Office clerks, why stop at the sorting? What about the canceling and dispatching?

## THE PROBLEM OF SAN FRANCISCO BAY.

In California a renewal of the old agitation against hydraulic mining has been started by influential agriculturists. It is asserted that the restraining dams built under the Camenatti act, for holding back the debris of the mines, are ineffectual and do not fulfill the purpose intended, the result often of faulty construction or deliberate indifference to the careful requirements of the law. Chinese are the principal offenders, and much litigation has been the result. Floods have swept many of the frail structures, with all their accumulations of sand and rock, away, and the consequences have been the ruin of agricultural lands and the increased shoaling of navigable streams. Fifty years ago began the disastrous filling up of streams, caused by the general and unrestrained pursuit of hydraulic mining. No estimate can be made of the quantities of debris washed down by this process. The evil results are visible in thousands of acres of fertile valley lands deeply covered over with sterile sands washed down by flooded streams from the mountains above. The area of navigable waters of the State is seriously curtailed.

In 1849 the Sacramento River was a clear and limpid stream navigable for vessels drawing 17 feet of water as far inland as where the city of Sacramento now stands and for two hundred miles further for vessels of seven or eight feet draught. Now, steamers and barges drawing not over three and one half feet can navigate the river at summer stages to Sacramento, and but twenty inches if they are bound to Red Bluff. The three fathom limit, which in 1849 extended to Sacramento, has contracted at the rate of one mile per annum for the last fifty years, and is now at Port Costa.

The Sacramento River is a stream having an average discharge of 600,000 cubic feet a minute. In 1849, Suisun Bay, into which the Sacramento and San Joaquin Rivers empty, was deep enough for any vessel at that time navigating the ocean; and Capt. Ringold, the first government surveyor to chart these waters, incorporated in his report careful directions for the guidance of square-rigged vessels navigating this bay. Now Suisun Bay is available only for light-draught schooners or stern-wheel steamers. From the beginning it has been the receptacle for untold quantities of debris, washed into it by the mountain streams.

In San Pablo Bay, embracing a large area west of Carquinez Straits, the ship channel extending from San Francisco Bay to Port Costa, the wheat terminus, which, in 1849, had a general width of two and one-half miles, with an average depth of three and one-half fathoms, in 1898 had contracted to less than a mile in width and is constantly shoaling. Thousands of acres of land bordering on the upper San Pablo, once covered at high tide, are now far above water line and utilized for agriculture. The east side of San Francisco Bay, against which the muddy currents of the streams are driven by prevailing winds, shows a decrease of depth and a constant onward march of the shoaling limit.

Mare Island straits, which early showed a depth of from four to six fathoms, were, until the present dredging operations began, impracticable even at the highest tides for ships exceeding 19 feet in draught. The battleship "Oregon," which draws 23 feet light, has never visited the navy yard on this account.

Facts like these are cited by agriculturists to justify the movement for altogether abolishing hydraulic mining, and it is admitted that unless measures are adopted for practically restraining the transfer of debris from the mountain streams into the bay, the closing of the upper waters of this magnificent stretch of navigable water to all-ocean craft will result.

For over twenty years, or since the cessation of hydraulic mining, the streams of California have never regained their original limpidity, and are even now apparently bringing down as great an amount of solid matter as ever. This is accounted for, in part, by the vast mounds of debris thrown out by early operations, which eventually find their way into the current through the operations of floods. But the process of filling up the bay comes also through the involuntary assistance of the agriculturists themselves. Scientific investigation demonstrates that the silt now flowing into the bay is not from the mountains altogether, but is, in great part, the soil washed from lands plowed for agricultural purposes. The very element that so consistently demanded and achieved the destruction of hydraulic mining is now doing that for which they successfully denounced an interest which in the past has contributed so greatly to enrich the world.

The result is expected that these two great interests

will eventually combine in an effort to save the splendid bay from utter destruction.

## THE PRODUCTION OF GOLD.

Of the \$10,000,000,000 of gold produced in the world since the discovery of America, more than one-half has been found since 1860, and more than one-quarter since 1885, or to put it in other words, one-half of the gold mined in the last 400 years has been produced within forty years, and one-fourth within fifteen years. The Treasury Bureau of Statistics has made some compilations regarding the gold production of the world in view of the temporary suspension of gold-mining in South Africa, and its possible effect upon the gold supply of the world. A casual examination of the figures of annual production shows plainly the very rapid increase during the last half of the closing century. From 1493 to 1600, \$501,640,000 worth of gold was found, the average annual production being \$4,644,815. From 1601 to 1700, \$806,315,000 worth was mined, and from 1701 to 1800, \$1,262,805,000. From 1801 to 1860, \$2,120,444,000 was produced, the average annual output being \$15,745,260. In the decade from 1861 to 1870 the average annual production arose to \$1,126,301,500, the total production being \$1,263,015,000. In the next ten years the production was slightly less, being \$1,150,814,000, and from 1881 to 1890 there was also a considerable decrease, the amount being \$1,060,055,600. From 1891 to 1899, the production increased in a remarkable degree, amounting to no less than \$1,867,971,000, the average annual amount being \$204,773,555. This makes the total production between 1493-1899, \$9,833,039,600.

An examination of the amount of gold produced from the mines of the Transvaal and by those of other countries shows that the gold production of the entire world is more than double that from the Transvaal; the latter mines produced \$79,213,952 worth of gold in 1898, while the production in other parts of the world was \$208,214,647, making a grand total of \$287,428,600.

## THE UTILIZATION OF WASTES FOR POWER.

In a paper read before the Institution of Civil Engineers, of London, Sir Douglass Fox describes a number of plants in which steam is produced for motive power by the combustion of waste. Of these the Shoreditch electrical plant is the oldest and most important. In twelve months it has burned more than 6,000 tons of residues, of which ninety-two per cent was household waste, the remainder consisting of paper, straw, etc. The combustion takes place in twelve furnaces of the Manlove-Alliott type, and the steam is produced by twelve Babcock & Wilcox boilers. The waste, upon arriving at the station, is weighed, then put into carts, which are raised to a platform above by two electric elevators. The carts are provided with electric motors, which take the current from trolley wires above the platform, and thus the waste is brought to the reservoirs above each furnace. It is estimated that from eighty to ninety tons are received per day. To secure the combustion, it is not necessary to add carbon in any form to the waste, as the temperature of the furnace is from 800° C. to 1,000° C. The cinners form thirty-two per cent of the total weight; they are utilized to form beton, and when mixed with Portland cement they make an excellent paving. Three electrically-operated pumps force the water into the feed-water heater, from which it is sent into great cylindrical reservoirs placed twenty feet above the boilers, into which it then passes by gravity. The steam is nearly all utilized for the production of electrical energy, and during the year over one million kilowatt-hours were supplied to consumers.

## A GREAT RUSSIAN PIPE LINE.

Russia possesses a pipe line over a hundred miles long in the petroleum region of Baku. This conduit, which is 8 inches in diameter, brings the oil collected in the Caucasus region to Batoum, on the Black Sea. It leaves from the station of Mikhailovs, on the Trans-Caucasian railway, not far from the frontier of Kutain and Tiflis. At the wells at Baku, the petroleum is collected in tank wagons and brought to the station, where it is poured into two great reservoirs having a capacity of 12,000 cubic meters. From this reservoir proceeds the pipe line in question; it is placed underneath the ground, and is provided with safety cut-off valves which divide it into sections in case of accident. On account of the grades passed over by the line, it has been necessary to provide three pumping stations; these are each equipped with three pumps operated by steam engines of 150 horse power. The maximum capacity of the pipe line is about 90 tons of oil per day. There is now some idea of bringing it to Baku, thus doing away with the wagon transportation, and to complete the line by others going from Baku to the eastern extremity of the Caucasus, toward Petrowsk; from there it is to pass to the north of the mountains by Novorossisk, and finally reach a point on the Black Sea.