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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 347,

For the Week ending August 26, 1882.

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POSTAGE STAMP LOSSES.

On several occasions the postal department has tried to determine approximately the number of pieces of each sort of mail matter transmitted by the post offices of the country in the course of a year. To keep an accurate record of each day's work throughout the year would add to the labor of the offices and involve delays that would cost more than the information would be worth. Accordingly the department has been content to make one week's work, as determined by actual count, the basis of an estimate for the year. A week thought likely to be one of average postal activity is selected, and all the matter received for transmission at each of the post offices is classified and counted, the aggregate of such original business during the appointed time being reckoned as the fifty-second part of the business of the year. Obviously the closeness of the approximation hinges entirely upon the fitness of the selected week to represent the average weekly work of the year.

Knowing approximately the number of pieces of each sort of mail matter handled, it is possible to estimate roughly the revenue the Government ought to receive from the sale of stamps, cards, stamped envelopes, etc., and from other postal charges. The estimate would necessarily involve a good deal of assumption and guesswork; yet if the estimated or calculated volume of business done is not unreasonably wide of the truth, the estimated revenue ought to be something near the actual revenue as reported in sales of stamps and the rest.

The *Evening Post* has gone to the trouble of collating the statistics given in the last annual report of the Post Office department, and comparing the sums which, according to its calculation, should have been paid for the conveyance of the matter embraced in the year's work as officially estimated, with the sums actually received, finding very serious discrepancies.

The sale of stamps, cards, stamped envelopes, etc., for the year aggregated $34,625,436. Assuming the department's estimate of annual business to be correct, and the *Post's* analysis of it equally correct, the department should have received from the sources named $42,795,815. The deficiency in receipts for the amount of matter conveyed thus exceeded eight million dollars. The *Post* remarks: "The immense deficiency in the number of postage stamps sold, according to the department's figures, is made especially striking by adding together the postage values of the letters and postal cards which made up the first-class mail. By so doing we obtain the sum of $34,628,784.84. If we deduct from this the $34,625,435.91 of postage stamps sold, without allowing for the special stamps and wrappers not used on letters, we have a deficiency of $3,348.93—leaving the whole of the second, third, and fourth class mails to be carried for nothing, and treating registration as free. If the $1,398,674 of newspaper and periodical stamps and the $431,154.60 of newspaper wrappers be deducted from the sum total of stamps sold, and the remainder be deducted from the value of the first-class mail, a deficiency of $1,833,177.53 appears in the revenue from that class of matter alone."

The experienced postmaster of this city, Mr. Pearson, to whom the *Post's* figures and deductions were submitted, mentioned four causes which might have contributed to produce the discrepancy: (1) Issued but unused stamps carried over from the previous year; (2) over-estimation of the number of pieces of mail matter handled; (3) unwise selection of the time for making the seven days' count, the week chosen being first before the holiday season, when the mails are more heavily loaded than at any other period; (4) the washing and fraudulent reissue of stamps. That the last cause was a very efficient one Mr. Pearson did not believe. He admitted that there were various ways of washing canceled stamps so that they could be used again, and it was possible that persons in different parts of the country practiced these methods independently of each other; he was confident, however, that no organized conspiracy existed for this purpose, since it would not be possible to dispose of large quantities of washed stamps without the plot being discovered.

The assumption that the concerted washing of stamps on a large scale would be necessary to cause the Government to lose materially by reused stamps will hardly hold. There are nearly 45,000 post offices in the country, and if the department were to carry from each office a single fraudulently stamped letter a day, the Government would be cheated to the extent of nearly half a millon dollars a year. It may not be possible to dispose of $8,000,000 worth of washed stamps in bulk; yet out of ten million letter writers it would not be possible to find enough who are willing to use again cleaned or imperfectly canceled stamps, and having opportunities enough to do it to cheat the revenue out of all that the deficiency is found to be.

That the cancellation of stamps is very frequently imperfect is known to all who handle many letters. In many instances the stamp is not defaced at all; in more the mark is so slight that it may be easily rubbed off. Mr. Pearson admits that no cancelling ink is ineffaceable, and expresses the opinion that postage stamps ought to be printed in fugitive colors, which would be removed by any attempt to wash off the canceling mark.

The conditions under which stamps must often be handled, however, by children and other unskillful persons, both before and after they are put upon matter to be mailed, forbids the use of other than fairly permanent ink in printing them. They are held in sweaty hands, carried in pockets, where they are subject to dampening by rain, perspiration, and the like, and always liable to over-wetting when the gum is moistened to affix them. Hence the necessity of good paper and waterproof ink.

If stamps are used, security against their reuse must be sought rather in some means of canceling them indelibly or destructively. Thus far no ink has been discovered that could not be discharged or washed off by suitable means. For destructive cancellation many devices have been tried to cut, abrade, rupture, or burn the paper of the stamp. None of these, however, have proved entirely satisfactory, their tendency being to mutilate or set on fire the letter or parcel the stamp is applied to. A more promising plan contemplates the use of a stamp of two parts, one to be gummed to the letter or package, the other to be left free, to be torn off by the postmaster and destroyed, making it impossible to use the same stamp again.

This plan seems well calculated to prevent the reuse of stamps except by parties inside the post offices, where there is reason to suspect a large part of this fraud upon the revenue is perpetrated. In multitudes of offices the new mail matter often lies for hours before being made ready for transmission. In such cases there is little or nothing to prevent a dishonest clerk from removing the uncanceled stamps and substituting those that have already been canceled. The individual frauds may be small, yet if frequently repeated in a large number of places, the aggregate loss to the department may mount up to millions.

The most obvious way of stopping frauds of this nature would seem to be the use of stamped envelopes and wrappers; and in view of the probable saving to the revenue by preventing reuse, the Government might find it profitable to encourage the more general employment of stamped envelopes, by allowing to purchasers of them a considerable discount from the price of the stamps. It might be practicable also to print the stamps across the face of the envelopes in such a way that in the writing of the address the stamp would necessarily be canceled. The usual post marks would suffice to show whether any wrapper had done its appointed service.

The ingenious reader will readily see how inviting a field is here presented for successful invention. The large amount of revenue involved, and the urgent demand the world over for a practical preventive of the frauds pointed out, make it certain that whoever will solve the problem will not fail of a large reward.

THE DENVER MINING EXPOSITION.

The National Mining Exposition just opened at Denver, Colorado, would be a credit to the oldest and richest of mining regions. Indeed it may be doubted if in any other part of the world so large and instructive an array of precious metals and their ores could have been collected for such a purpose. The effect in convincing the visiting world of the substantial wealth of a multitude of mining districts scattered over the Rocky Mountain country, and now known only as outlandish names on the newer maps, cannot but be enormously beneficial to the States and Territories represented.

The exhibition was opened the first of the month, and has been a popular success from the start.

The exhibition building is a handsome and substantial structure covering four acres. It is in the form of a cross, 500 feet from north to south, and 300 feet from east to west, with spacious vestibules and entrances at the four extremities. There are 2,000 linear feet of galleries, 29 feet in width, supported by solid columns, and approached by eight broad and easy stairways. Two more stairways and two elevators give access to the central tower, 80 feet in height. Each of the eight corner towers, 70 feet high, is approached by a special stairway. The building is lighted by 800 windows.

The exhibits are arranged in thirteen departments: (*a*) Mineralogy, with eleven classes, comprising ores of the precious and the useful metals, clays, coals, and other metalliferous specimens; (*b*) Geology, eight classes; (*c*) Hardware, edge tools, and all cast and wrought iron goods, in four classes; (*d*) Metallurgical machinery, in four classes; (*e*) Agricultural and horticultural products, and floral displays, dairy products, etc., six classes; (*f*) General machinery, including steam engines and machine tools, printing, pneumatic, leather working, and laundry machinery, five classes; (*g*) Agricultural and horticultural implements, machinery, tools, carriages, wagons, etc., four classes; (*h*) Textile fabrics, leather, furs, and the like, four classes; (*i*) Household goods, watches, jewelry, optical and scientific instruments, ornamental articles, ceramics, etc., six classes; (*k*) Liberal arts, natural science, and education, five classes; (*l*) Food preparations and miscellaneous articles used in domestic economy, miners' supplies, etc., three classes; (*m*) Chemical and medicinal preparations, illuminating and lubricating oils, etc., four classes; (*n*) Miscellaneous unclassified articles. The main building contains over 150,000 square feet of floor area, yet the demands for space have made several annexes necessary.

The machinery is driven by a 250 horse power Corliss engine of Chicago make. The display of mining machinery is very full and attractive, particularly to those directly interested in mining. Popular interest, however, naturally centers in the vast and varied collections of ores and minerals, which have been gathered by carloads from hundreds of mining districts scarcely yet heard of by the Eastern world.

Through her advantages of situation and superior mining

development Colorado naturally leads in the richness and variety of her exhibits. This State has suddenly risen to the first rank as a silver producer, and stands close to the head of the list of Gold States. In the relation of production to area Colorado holds the first rank; for gold and silver combined she stands at the head, and likewise for silver alone. Exclusive of coal and iron her metallic product the census year was twenty-two and three quarter million dollars, and nearly if not quite as much last year. Lake county, which yields more than half the total product of the State, is richly represented in the exhibition, but not quite so brilliantly as the newer district of Gunnison county, which has required an annex to receive the excess sent by the enthusiastic miners. The Gunnison exhibits include thousands of pounds of rich carbonates, great blocks of ruby silver, native silver, iron, coal, and marble. For the transportation of one block of galena weighing 4,000 pounds a special road had to be constructed over the mountains. From the other mining districts of the State generous contributions of gold, silver, lead, and copper ores have been sent to the exhibition, the baldest enumeration of which would fill columns.

The exhibits from Utah rank next to those of Colorado in variety and volume. About fifty productive mines and over a hundred prospects are represented. The majority are silver-load ores; among the rest are ores of antimony—one block of 3,000 pounds assaying 60 per cent; bismuth; a 500 pound block of sulphur, nearly pure; great masses of iron ore; brown coals from beds of three to thirty feet in thickness; mineral wax from the Wahsatch Mountains; marbles in great variety, and other minerals testifying to the vast undeveloped wealth of the great basin.

The exhibits from New Mexico embrace a great variety of silver, gold, copper, and lead ores, turquoises, and small specimens of all the minerals found in the Territory; also a fine display of native jewelry, Pueblo pottery, blankets, etc. Grant county sends specimens from two hundred mines, and other counties are represented by ores from a hundred mines or more each. The Arizona exhibits come mainly from the Tombstone District and from Pima and Pinal counties.

The Copper Queen Mine sends a pyramidal mass of copper ore weighing two tons. It is a carbonate, assaying from twenty three to twenty-five per cent. A seven ton block of galena is to be added to the exhibits from this territory. Some of the richest ore is contributed by the West Side Mine, assaying 3,339 ounces silver to the ton, with a large assay of gold. Another specimen yields 2,905·7 ounces of silver and 21·88 ounces of gold. The Contention property exhibits a sample of telluride of gold and horn silver that assays $1,762.10 gold and $12,378.15 silver. A specimen from the Grand Central Mine, Tombstone District, weighing 115 pounds, runs $11,923.22 to the ton, of which $2,286.29 is gold and $9,536.93 silver.

Wyoming, Montana, Dakota, and Idaho are represented by specimens aggregating many tons, among them a block of soda from Wyoming, weighing 500 pounds, and Montana ores assaying as high as 3,300 ounces of silver.

Though presenting less of novelty, the agricultural displays are large and attractive; and the same may be said of the machinery departments, which comprise a great variety of crushers, amalgamating machines, pumps, engines, excavators, and other appliances for raising and reducing the buried wealth of the mountains. The exhibition will remain open until October, and part of it is intended to be permanent.

PRISON ELECTRICITY.

Opposition to prison labor is not altogether unreasonable from the standpoint of the artisan whose trade is invaded and the products of whose labor are undersold by contractors employing convicts. Yet to the public at large the maintenance of large numbers of prisoners in unproductive idleness would appear still more outrageous, indeed not to be thought of.

That offenders against the peace and property of the community should be made self supporting, however, is not more simple and reasonable in theory than it is difficult to put into practice. It is particularly difficult with those who most need the discipline of labor—the petty offenders who fill our police courts and penitentiaries under short time sentences. It is not easy to find useful employment for unskilled tramps, drunkards, station house rounders and the like, who make up the large portion of the criminal classes and ultimately furnish most of the long term convicts. The latter can be taught the simpler trades, and, under the contract system or otherwise, made to pay for their keeping or more, though the conditions under which such labor is massed and employed are such as to yield results not at all pleasing to those who are employed in the same trades outside of prison walls.

Originally the clause "hard labor" in the sentences of malefactors contemplated labor purely as a punishment. It was not productive labor. The convict was put into a treadmill or set to turning a loaded crank, no attempt being made to utilize the energy exerted. The treadmill has been displaced partly for sentimental, partly for economic reasons. The convicts hated it, and no useful result came of it. The substituted factory system yields better results, and worse. Prison labor is now productive; but it is apt to interfere grievously with prison discipline, and also with the rights, real or fancied, of honest labor, as may be seen in the universal condemnation of prison labor by trades unions.

It is suggested that all the penal advantages of the old treadmill system may be regained, with better economic results than with the factory system, by attaching dynamo-electric machines to the cranks, and storing electrically the energy developed. In this way the prisons and penitentiaries would be converted into sources of brute energy to be sold for outside use in running machinery, electric lighting systems and the like. Blackwell's Island, for instance, now maintained at great cost as a harbor of refuge for drunkards and other petty offenders, sent up for ten days or a month at a time, would become a valuable source of convertible power to be sold for industrial uses. The "rounders" might not like the place so well, but the honest public would like it better. Ten days in the treadmill would sober off a "beat" as effectually as ten days of idleness, and in the interval he might help to store up many "foot-tons" of available energy. With prisoners under long sentences the plan might not be so profitable to the State, but it would obviate what is becoming the source of much social and political controversy. Skill wisely directed is worth more than mere energy, and a good boot or hat may sell for more than the energy the maker could store up in the same time in a Plante cell by turning a crank. But the storage cell would never give offense to the citizen who was trying to support a family by the voluntary production of boots or hats, while the indirect economy that would flow from a simplification of prison work, with the prompter utilization of the strength of criminals of all grades and conditions, might more than make up for the loss through the less profitable employment of a few skilled hands.

Oil and Mineral Deposits at Mendoza, South America.

A correspondent residing at Mendoza, the capital of the province of the same name of the Argentine Confederation, calls attention to the promising deposits of minerals and mineral oil in that little known region. Mendoza lies close to the Chilian frontier at the foot of the Andes, in latitude 33° south, longitude 69° west. It is soon to be brought into closer communication with the coast and rest of the world by the nearly completed Andean Railway. The mineral deposits close to the city are described as immensely valuable, yet almost entirely neglected. The opening up of steam communication will make the region, our correspondent thinks, an exceedingly promising one for investment and enterprise.

The petroleum deposits are found at the foot of the first spurs of the Andes, on an open plain, about ten leagues southwest from Mendoza, at a place called La Sierra de Cacheuta. Some of the oil collected on the surface of the ground showed on analysis:

Volatile combustible matter	91·66
Fixed carbon	7·24
Ash	1·10

As all the kerosene used in the republic is imported from the United States, it is believed that a refinery at Mendoza would find it easy to command the large home market, and be able also to export largely to the adjoining republics of Chili, Peru, Bolivia, etc., and to the Brazilian Empire. The price of kerosene at Mendoza is $5 a can.

In the immediate vicinity of the oil springs, precious metals are found in considerable quantities, and a large amount of silver is extracted in a desultory sort of way from a mine close at hand.

The climate of the region is temperate and salubrious, and allows the production in perfection of all European grains and fruits.

Lubricator Litigation.

In a paragraph in our number for July 22 last, it was inadvertently stated that in the suit of the Detroit Lubricator Company against a concern styled the American Lubricator Company, the verdict was in favor of the latter. It should have stated just the contrary. The verdict was in favor of the Detroit Lubricating Company, fully confirming and sustaining their rights. The suit was brought in the United States Court, Eastern District of Michigan, Justice Mathews presiding. The patent of the Detroit Lubricator Company, sustained, as above stated, by the Court, was granted May 22, 1877, number 191,171. The invention has proved to be very valuable in the economy of the steam-engine, and is being very extensively adopted. Persistent attempts to infringe appear to have been made by the concern styled the American Lubricator Company, who carried the folly so far that they continued their infringements after a verdict and an injunction was obtained against them; the final result being that the principal members of the concern were brought up before Judge Brown, of the U. S. Court, in February last, adjudged guilty of contempt, and fined, besides having to pay costs.

A Ride through the Thames Tunnel in a Phosphorescent Railway Carriage.

At the present time a railway carriage painted inside with the Balmain phosphorescent paint, is included in the train which leaves Liverpool Street station for Rotherhithe, *via* the Thames Tunnel, at 11:8 A.M. Although only one-half of the available space of the carriage is painted, the phosphorescent light is quite sufficient to enable the passengers to distinguish small objects when passing through the tunnel; and, moreover, the light is powerful enough to enable a person to read the indication of an ordinary watch. It is probable that the railway companies will be enabled to effect a considerable saving in gas and oil by using the phosphorescent paint.

Recovery from Rabies.

On more than one ground the possibility of the recovery of dogs from attacks of rabies is of great importance. The demonstration that this terrible disease is not invariably fatal, even in the animals most prone to it, may at least be welcomed as affording a ray of hope for therapeutics, while the fact of the recovery of affected animals may afford an explanation of many mysterious outbreaks of the disease. M. Decroix lately communicated to the Académie de Médecine nine cases which he had collected of well-authenticated recovery from rabies. (1) M. Ménecier inoculated two dogs and a rabbit with the saliva of a rabid dog; all three died from rabies, but the dog from which the saliva was obtained recovered. (2) Decroix inoculated a dog with the saliva of one suffering from rabies; the latter died, the former became affected with characteristic rabies and recovered. (3) Some saliva was obtained from a man some hours before he died from hydrophobia, and with it a dog was inoculated; the animal presented well-marked symptoms, but recovered. (4) Reg of Lyons recorded the recovery of a dog with furious rabies, due to a bite from another rabid animal. (5) A military veterinary surgeon, Laquerrière, has recorded the case of a dog affected in consequence of a bite from an animal unquestionably rabid. The destruction of the dog was ordered, but the owner refused consent, and the dog recovered without treatment. The four remaining cases were of recovery from rabies, in man in three cases, and in the horse in the last. Decroix points out that in furious rabies the attacks increase in frequency and intensity during two or three days, then attain their maximum, and disappear in two or three days more, whereas death does not occur until the fifth or sixth day. The eminent authorities who have never met with an instance of recovery are scarcely justified in denying the occurrence of such cases described by those practitioners who have seen them. The Rabies Committee, of which M. Decroix was president, has made, since 1874, a host of experiments with various substances of reputed value in rabies, three of them with pilocarpine, and every supposed remedy which they employed appeared actually to hasten death by the violent paroxysms which it caused. The conclusions of M. Decroix are that it is experimentally demonstrated that rabies may terminate in spontaneous recovery. Up to the present day no agent has made good its claim as a remedy for rabies. The cases of recovery attributed to this or that agent may be, with equal justice, ascribed to the spontaneous termination of the disease. The dogs which recovered in the experiments carried on by the committee were left at rest, and, since the administration of medicines usually provokes convulsive seizures, it seems desirable, according to our present knowledge, to leave persons affected with the hydrophobia in the most perfect possible calm, trying experiments only upon animals. In absolute quietude and obscurity the paroxysms are far less terrible than when medicines are administered, and M. Decroix asserts that if these conditions could be secured, he would far rather suffer from hydrophobia than from many other disease. It may, however, be observed that we are scarcely justified in drawing, from the superior results of therapeutic inactivity in dogs, the same lesson in the case of the disease in man. The administration of a drug to the human sufferer by the skin or rectum, or sometimes even by the mouth, may be effected with far less disturbance than in the case of the dog. Without doubt, however, he is correct in insisting on the absolute importance of perfect tranquillity, and of the avoidance of everything which may in any degree help to excite the paroxysms. It may be doubted also whether dogs are the best subjects for therapeutic experiments, since it is probable that the conditions met with in the human subject obtain more closely in the herbivora than in the carnivora. It is very desirable, in the case of any recovery from rabies, that it should be ascertained at what date the saliva ceases to be infectious, and whether the disease can be communicated after the animal has to all appearance recovered. This is a not improbable explanation of the occasional alleged occurrence of the disease from the bite of healthy animals.—*Lancet.*

Is the Gila Monster Venomous?

In the SCIENTIFIC AMERICAN of December 20, 1879, there was figured for the first time the large lizard known in Arizona as the gila monster, and to science as *Heloderma suspectum* (Cope), or *horridum*. Among the Mexicans this reptile is supposed to be venomous, and marvelous stories are told of its pestilent breath. Our naturalists, however, declare the animal to be harmless. From the account of the specimen that has recently reached London (see page 135) it would appear that the naturalists of the Zoological Gardens there are satisfied that the reptile has a mouthful of teeth all supplied with venom. The evidence given in support of that view, however, is not at all convincing. It is to be hoped that the matter will now be more fully investigated. It is barely possible that our American naturalists have prejudged the case.

EFFECTS OF LIGHTNING.—During a recent heavy thunderstorm in the Shetland Islands, which lasted several hours, a hill three miles from Lerwick was struck by lightning, and large masses of rocks and *débris*, estimated to weigh 400 tons, were thrown down on to the public road immediately below and stopped the traffic. At the spot where the lightning struck there is a deep rut extending down the face of the hill.