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SCIENTIFIC AMERICAN SUPPLEMENT

No. 592,

For the Week Ending May 7, 1887.

Price 10 cents. For sale by all newsdealers.

FRENCH EXPORT WINE.

United States Consul Gifford, at Bordeaux, warns the American public to beware of French liquors, more especially brandy, for that *no pure French brandy* is sent hither. After commenting upon the methods employed in making brandy for export, he goes on to say that the labels on the bottles do not represent the quality of the liquid they contain. The dates 1863, 1870, 1875, etc., do not, he says, mean that the inclosed liquid is brandy put up in those years. It means that the liquid has been made to resemble as closely as possible that which was really made in those years. In other words, the brandy sent hither from France is spurious, a concoction put up in the laboratory, in which the taste of good brandy is counterfeited by various chemicals.

It is worthy of comment that, while the laws against selling spurious wines and liquors in France are rigid in the extreme, little or no attempt is made to prevent the chemical preparation and adulteration of these liquids for exportation. Quite recently, the proprietors of a Paris restaurant were arrested and tried for selling a wine which, by its composition, must have been intended only for export. It was colored with an extract of coal and mixed with plaster of Paris—a pretty combination truly! A man and his children who drank it testified that it had "a very pleasant taste of raspberries," which shows what imagination will do. But even so strong an imagination as this was not equal to withstanding the effects of the wine, and a doctor had to be called in. The suit was brought by the Municipal Laboratory, and the punishment inflicted a fine of 1,000 francs and one year's imprisonment.

PANAMA CANAL DIFFICULTIES.

The prospects for a canal at Panama seem more illusive as time goes on, and not even the skill and perseverance of the French engineers has, so far, sufficed to lend to the scheme the air of practicability. Indeed, the tenacity with which these engineers adhere to the work must be regarded as remarkable by those who know how formidable and disheartening have been the obstacles which came with its development. These have been pointed out and discussed in our columns in the order of their appearance—the deadliness of the climate, the necessity for a monstrous dam at Gamboa, the great difference in level between the Atlantic and Pacific Oceans, and the disappointing character of the rock to be cut into in the mountain section.

Now comes the news from Panama that fully fifty per cent of the excavated material from the sections of the canal route is washed back again by the floods, and that this has been going on year by year ever since work was begun, without any announcement of the fact in the reports. The contractors working in the various sections are paid certain rates per cubic yard for material taken out, and if any part of this is washed back again they must be paid for once more removing it at the same rates as when first handled. Thus the company has been, and is, paying over and over again for the handling of much of the excavated matter, and, because of the continual floods and freshets, is never sure of keeping it permanently out.

For four years the engineers have been studying the problem as to how the furious floods of the Chagres River can be stayed or checked—as yet, without finding a solution. A recent writer on this subject makes the following interesting quotation from page 55 of the Manchester Geographical Society's journal for the first quarter of the year 1886:

"The Chagres is a torrent on the scale of a river, which intersects the proposed bed of the canal at twenty-nine points, and, when swollen by rains, sometimes raising its level thirty or forty feet in a day, discharges upon the valley a flood volume four times that of the highest ever measured on the Thames. The proposed remedy is to dam it up in a lateral ravine, through which it leaps down at right angles to the canal trench, by an embankment, whose mass of 20,000,000 cubic meters, with a base of 960 meters, would measure nearly a mile in length and 148 feet high. This mighty barrage will hold a milliard cubic meters of water suspended on the flanks of the mountain in a colossal basin twenty miles in length, which, if filled at the rate of a cubic meter a minute since the Christian era, would only begin to overflow in 1903."

So far, out of a total of 200,000,000 cubic meters of material to be excavated (not counting back wash), 37,727,000 had been taken out up to last January, thus leaving 162,273,000 yet remaining. The amount expended is said to have been $60,000,000 in stock and $240,000,000 in bonds.

The Link Belt Machinery Co. of Chicago.

The United States Court has decided that the drive chain heretofore made by the Moline Malleable Iron Co. is an infringement, and they have been enjoined from the further manufacture. The company has settled all claims for damages, and no suits will be brought against their customers. The Link Belt Machinery Co. of Chicago will hereafter furnish repairs for the Moline Co.'s chains now in use.

Breaking Glass Tubes.

Small glass tubes, less than five-eighths inch in diameter, give no trouble at all in breaking to any desired length, provided there are two or three inches to be broken off. Make a deep scratch—it need not go far round—on the tube, and then, with both thumbs close together, pull strongly and bend from the scratch. Tubes from three-eighths inch to one inch in diameter may be cracked by making a scratch as before, and heating circumferentially in a blowpipe flame. The flame should be very small, and the tube turned rapidly to prevent irregular cracking. Heat as small an area as possible on each side of the crack. If the glass is not very thick, about half a dozen turns will be enough to heat it sufficiently. As soon as this is done, take it out and blow sharply with the breath just on the scratch, and a beautiful clean crack will spring partly round. The parts may then be pulled asunder. This is a very successful method with English glass, but that of German manufacture is apt to fly unless carefully done.

Perhaps the easiest way for tubes that cannot be pulled asunder cold is to make the scratch and then dab on a piece of white hot glass. The way to do this is to fuse up in the blowpipe a bead on the end of a fiber. The smaller and hotter it is, the better chance of a square crack. This is the method to use when only a ragged corner or a short end has to come off. If there is an electric current handy, the largest tubes may be cut with certainty. Just where the scratch has been made wind one turn of wire—platinum is the best—of such length and diameter as to get white hot when the current passes through it. The ends where the wire leaves the glass should be as close as possible, but must not touch so as to short circuit. The part round the glass keeps much cooler than the other, but the current may be switched on and off, so as to have it red hot without overheating the free part.

Another method for large tubes, but one not generally so successful, is this: About one-half inch on each side of the scratch wrap strips of wet blotting or filter paper, and then turn the bare part in front of a sharp pointed flame. If the crack starts well, it may be led round by the flame. One of the most important factors of success in all these methods is the scratch, which can best be done with a knife, generally a rectangular piece of good steel hardened in salt water and sharpened. It is best not to scrape the knife against the glass, but to turn the latter while resting in a notch in the tube against some ridge in the knife, which is pressed firmly against the tube.

Treatment of Diphtheria by the Bichloride of Mercury.

Dr. E. L. Oatman, of Nyack, writes that for the past two years he has treated diphtheria by the local use of a solution of the mercuric bichloride, and has been greatly pleased with the results obtained. "Iron in large doses and free stimulation certainly play an important part in the treatment; but with these alone I lost—at St. Agatha's Asylum—ten out of twenty-three cases, while since the addition of local treatment by the mercuric solution, I have lost but one out of thirty-four subsequent cases. This patient died two weeks after the subsidence of all local symptoms, from paralysis of the muscles of respiration. Seven of my cases have had more or less paralysis of the muscles of deglutition during convalescence. This appears to be a large percentage, and might direct some suspicion toward the mercury as being in a measure causative. The details of treatment in an ordinary case, and as followed in the hospital ward, are as follows: I manufacture on the spot about fifty swabs—made by twisting absorbent cotton around a stick about the size of a lead pencil. The cotton should be pulled out and twisted firmly around the tip of the stick, extending beyond it, that the end may be thoroughly protected, so that no injury be done while using it. This is dipped in a solution of the bichloride of mercury, two grains to one pint of water, and is passed into the throat until it touches the posterior wall of the pharynx. It is then instantly withdrawn and burnt. No swab should ever be used a second time. No attempts are made to rub off any of the membrane, but more or less always adheres to the swab. This procedure is repeated hourly, day and night, until the disease begins to subside—which it usually does in forty-eight hours. I follow every application by the internal administration of five to ten minims of tincture of the chloride of iron, and as much whisky and milk as the case appears to demand. If the interior or posterior nares are invaded, the nose should be syringed. The conical urethral syringe is the safest instrument to leave in the hands of a non-professional nurse. It is of the first importance that the nurse or mother be fully instructed in the method of treatment, and should make the application satisfactorily to the physician before being left in charge of the patient. In no case have I ever experienced any difficulty in getting my instructions carried out, or met with any serious resistance from the patient.

"Spraying the throat is a far more difficult procedure for the lay attendant, as the tongue obstructs the pas-

sage, while none of the loose membrane and mucus is removed as with the swab, but is swallowed, and systematic infection furthered. The diphtheritic membrane cannot flourish in contact with the bichloride of mercury, and if this invaluable agent be constantly applied to the diseased surface for a few hours, the poison will be destroyed. I attach great importance to the method of application, and the extraction of the loosened membrane, beneath which the poison is still active, but inaccessible to the antiseptic."—*Medical Record.*

In Slumber for Five Years.

An extraordinary case of suspended animation is reported from Thenelles, a town in France. The subject is a young woman, twenty-five years of age, and since the 20th of May, 1883, she has been continuously in a state of deep sleep. She has been examined by physicians and specialists a number of times, and recently by a select committee, and from their observations it was learned that her sleep resembled a lethargic torpor, in which her respiration was normal, and her pulse, although feeble, was found to be rapid—about 100 pulsations a minute.

Every attempt to arouse her from her stupor has proved unsuccessful, and the senses appear closed to every influence. Sounds, pinching, blows, piercing the body with a needle, alike have no effect. The eyes are cast upward so far that it is not possible to examine the pupil, nor is any reflex movement of the eyelids noticeable when the eyeballs are blown upon. The jaws are firmly set, and several of the teeth of the subject have been broken in ignorant attempts to force them apart.

The subject was in a very delicate state of health before falling into the lethargy, and was of a nervous, highly strung temperament, and was thrown into a series of convulsions by a sudden fright, which was followed by the deep sleep from which she has never been aroused. It is possible to feed her with liquids, administered with a spoon, and this is done several times a day, the food consisting usually of milk, and milk with the white of egg, sirup and other liquids. The fluid is poured into the mouth and thence it flows into the pharynx, when a swallowing movement may be observed.

The *Revue de l'Hypnotism*, which has a long article concerning this case, considers the patient an hysterical epileptic, thrown into a condition resembling that period of hypnotism which is designated lethargic sleep. It is probable that life will continue for some time longer, provided the digestive processes continue uninterrupted, although death usually marks the end of these long periods of inanition.

Several Things Worth Knowing.

A drilled well should be made deep, that it may hold considerable water. If not, it may too easily be pumped dry. Moreover, the fine sand generally present works its way, not only filling up the lower end of the casing, but when the pump pipe is set low, and is pumping fast, some of the fine sand will be pumped up and lodge in the valve, soon causing the valve to stay partly open, so that the pump will not hold water, but must be primed for a new start. If the well be drilled deep after it is first reached, a space can be allowed for filling up, and the pump pipe need not be placed so near the bottom. But there is less danger of filling up if the well be thoroughly cleaned or pumped out after being sunk to the proper depth. This work, says the *Industrial Gazette*, properly belongs to the men who drill the well, and should never be omitted. A great deal of floating sediment, if not removed then and there, will be a source of trouble ever afterward.

More bridge work is projected at this date than ever in the history of the country. Two are projected across the Hudson, six across the Mississippi, two across the Missouri, a $10,000,000 bridge across the Potomac, 4,660 feet long, besides a multitude of smaller bridges. The bridge works are constantly overrun with work, and bridge iron makers are unable to accept all the business offered. Four bridge building works are projected, and an expansion of mill capacity is going on.

It is reported from Baku that a gigantic oil spring burst forth there on the 22d of March, carrying up oil, sand, and large stones to a height of 350 feet. It overran several reservoirs prepared for it, and, after forming an extensive petroleum lake, forced its way into the sea.

Dr. Vulpian has communicated to the Paris Academy of Sciences the result of some experiments of inoculation against yellow fever, which have been made at Rio Janeiro in the epidemic lately prevailing there. Of 6,524 persons thus treated, only six died, or one per thousand; while the proportion of deaths among inhabitants not inoculated was one per cent. Two Brazilian doctors are about to proceed to Panama to apply the treatment to workers on the isthmus, among whom the mortality is said to be very great.

The Smithsonian Institution has received from Col. J. H. Wood, of St. Paul, the bodies of five persons—a man, woman, and three children—taken from a cave in the Bad Lands of Dakota by a miner. The bodies are simply dried up, and are not petrified, but are in a remarkable state of preservation. Scientific men who have seen them say they belong to a race which existed two thousand years ago.

Reports of the devastation and loss of life by the recent cyclones in Kansas, Missouri, and Arkansas are heartrending, and the number of lives lost is much greater than was at first anticipated, and would have been much greater had not many provided dugouts, in which they concealed themselves till danger was over.

It is admitted by most workmen that the best method of tempering many kinds of tools, especially drills, is to force the implement when at a cherry red heat into a bar of lead.

The ARCHITECTS AND BUILDERS edition of the SCIENTIFIC AMERICAN has, since the publication was commenced—eighteen months ago—met with phenomenal success, having acquired, in so short a time, a circulation unprecedented by any publication of its class.

In a recent case decided between architect and client at Albany, the client having notified the architect to stop work after he had ordered specifications, details, and estimates to be prepared on designs accepted by him, the client was compelled to pay three and a half per cent on the amount the building was to cost. The referee based this on one per cent for the sketches and two and a half per cent for working plans, specifications and details, and obtaining estimates. The architect sent in a bill for $550, and the sum awarded him was $417.50 for his trouble, expense, and work.

The following recipe for keeping moths out of clothing is a favorite in some families: Mix half a pint of alcohol, the same quantity of spirits of turpentine, and t woounces of camphor. Keep in a stone bottle, and shake before using. The clothes or furs are to be wrapped in linen, and crumpled up pieces of blotting paper dipped in the liquid are to be placed in a box with them.

In boring an artesian well at Eureka, Cal., charred wood was found at 500 feet, and pieces of shell and parts of the skeleton of a bird at 580 feet.

THE PARIS EXHIBITION.—The next International Exhibition, to be held in Paris, in 1889, like that of 1878, is to be adorned with a captive balloon. It is to be of enormous size; and, as in 1878, the maximum altitude reached will be about three thousand two hundred and fifty feet. An engine of six hundred horse power will be employed to pull the enormous mass back to Mother Earth. It will be remembered that the balloon of 1878 was torn to pieces in a high wind, owing to the fact that it was not kept full of gas. In the new balloon a special precaution is to be taken to preserve the tightness of the envelope, so that the wind can find in it no hollow or wrinkle. A smaller balloon, filled with atmospheric air, is to be placed inside the large one, and the volume of this smaller balloon can be increased or diminished by means of an air pump worked by an electric engine in the car. By this means variations of temperature, with the consequent alteration of bulk in the gas, can be compensated for.

An Easy Way to Prevent Loss of Apples.

To determine its value as an insecticide, arsenic in solution was compared with Paris green. The arsenic solution was made by boiling one ounce of arsenic in one quart of water, and adding this solution to 20 gals. of cold water. The Paris green mixture consisted of three-fourths of an ounce of this substance (containing 15·4 per cent metallic arsenic) stirred in two and one-half gals. water. A fine, mist-like spray of the liquid was applied until the leaves began to drip. The number of apples examined on eight trees, two of which were sprayed with the arsenic solution and six with Paris green, up to Oct. 4, was 38,688. Eight untreated trees were used as checks. During 1885 Paris green was also used as noted above, and 69 per cent of the fruit which would otherwise have been sacrificed to the codling moth was saved. In the 1886 experiments, 73 per cent was saved from falling by a single spraying, 77 per cent by two, and about 72 per cent by three sprayings. The benefit to the picked fruit apparent from a single spraying was placed at 47 per cent, from two 90 per cent, and three at 77 per cent, or as summarized, spraying in early spring, before the young apples had drooped upon their stems, saved 75 per cent of the apples exposed to injury from codling moth. The weather conditions prevailing shortly after the poison is applied will have much to do with its efficacy. The best results from the application of Paris green were secured upon the appearance of the first brood. Experimental facts point to inefficiency as applied to later broods. It is not recommended to poison full grown apples. In fact, spraying after the apples have begun to hang downward is unquestionably dangerous, and should *never* be done if the fruit is to be used. In comparing arsenic with Paris green, the experiments show a decided advantage in favor of the latter. Trees sprayed with arsenic scorched the leaves, while Paris green produced no injurious effects. Prof. Forbes finally concludes that at least 70 per cent of the loss commonly suffered by the fruit grower from the codling moth may be prevented at a nominal expense, by thoroughly applying Paris green in a spray with water, once or twice in early spring, as soon as the fruit is fairly set.—*S. A. Forbes, Bull. i., State Ento. of Ill.*, 1887.

The Living Earth.

As another illustration of the life that dwells in nature, let us briefly consider earthquakes. The peculiar terror of an earthquake lies mainly in the suddenness of its approach. Volcanic eruptions are usually preceded by vast rumblings, or jets of steam, or other unmistakeable tokens. Hurricanes and cyclones in like manner have heralds that announce their coming. But with an earthquake there are no premonitory symptoms. The great earthquake which took place at Lisbon in the year 1755 found the people engaged in their ordinary occupations. All the shocks were over in about five minutes. The first shock lasted about six seconds. In that brief space of time most of the houses had been thrown down and thousands of men, women, and children crushed beneath the ruins. At times the ocean lends fresh terrors to the scene. Thus at Lisbon a wave of water over fifty feet high rushed in among the houses, and covered what still remained. In the island of Jamaica on a different occasion two thousand five hundred houses were buried in three minutes under thirty feet of water. Recent delicate scientific experiments have discovered the fact that the surface of the land is never absolutely at rest for more than thirty hours at a time. Thus those great earthquakes which make epochs in history are merely extreme cases of forces that seldom sleep.—Extract from a lecture by A. Ewbank in *Indian Engineer*, published in Calcutta.

The Size of Ocean Steamships.

The following table gives the name, date of construction, tonnage, length, breadth, and depth of the principal steamships plying between European and American shores:

Name.	Built.	Gross tonnage.	Length.	Beam.	Depth.
City of Rome	1881	8,144	546	52	37
Umbria	1884	7,800	500	57·2	38·1
Etruria	1884	7,718	501·6	57·2	38
Servia	1881	7,392	515	52·1	37
Aurania	1882	7,269	470	57·2	37·2
Le Bretagne	1886	7,012	508·4	52·4	38·4
La Bourgogne	1886	7,000	508·6	52·2	38·8
La Champagne	1886	7,005	508·7	51 6	38·4
La Gascogne	1886	7,008	508·7	52·2	38·3
Alaska	1881	6,932	500	50·6	38
America	1883	6,500	432	51·3	35·8
Normandie	1882	6,062	459	50	37
Westernland	1883	5,736	455	47	35
Saale	1886	5,500	455	48	38
Trave	1886	5,500	455	48	38
Aller	1886	5,500	455	48	38
City of Berlin	1874	5,491	488·6	44·2	34·9
Noordland	1883	5,212	400·7	47	35·3
City of Chicago	1883	5,202	430	45	33·6
Eider	1883	5,200	450	47	33·6
Arizona	1879	5,147	464	46	37
Ems	1884	5,129	430·5	47	34·5
Fulda	1883	5,109	450	46	36
Werra	1882	5,109	450	46	36
Belgravia	1881	5,060	398·2	44·5	32·2
Germanic	1874	5,008	455	45·2	33·7
Britannic	1874	5,004	455	45·2	33·7
Elbe	1881	4,911	420	45	36·5
England	1865	4,898	437	42·5	35
Egyptian Monarch	1880	4,709	370	44	35·8
Egypt	1871	4,610	440	44·3	36 5
France (Fr.)	1865	4,647	384	44	36
Amerique	1864	4,637	394	42·0	36·9
City of Richmond	1873	4,607	452·6	43	36
Erin	1864	4,500	415	41	35
City of Chester	1873	4,565	475	44·3	35
Spain	1871	4,512	425·4	43·2	36·2
City of Montreal	1871	4,451	419·1	44	34·3
The Queen	1865	4,457	381·1	42·4	37·3
Grecian Monarch	1882	4,364	381	43	33
Greece	1863	4,310	390·7	41·3	35·3
Devonia	1877	4,269	400	42	32
Hammonia	1882	4,247	375	45	34
Italy	1870	4,169	389	42·3	38 7
Anchoria	1874	4,168	480	40·1	33·8
State of Nebraska	1880	4,000	385	43	34
Ethiopia	1873	4,005	402	40·2	33
Lydian Monarch	1881	3,916	360	43	32·4
Adriatic	1871	3,888	437·2	40·9	31
Celtic	1872	3,867	437·2	40·9	31
Denmark	1865	3,724	342·9	42 2	36
Republic	1871	3,707	420	40·9	31
Baltic	1871	3,707	420	40·9	31
Suevia	1874	3,704	360	41	34
Wisconsin	1870	3,700	378	43·2	32

Other well known ships are the France, State of Nevada, State of Pennsylvania, Monarch, Rhynland, Abyssinia, Australia, Lessing, Wyoming, Rugia, Belgenland, Wieland, State of Alabama, Westphalia, Pennland, Zeeland, Assyrian Monarch, State of Georgia, Bohemia, State of Indiana, Acadia, Nederland, Alexandria, and Assyria. These register from 3,600 to 1,082 tons. The Acadia is the smallest.—*The Engineer.*

Sheep.

The number of sheep in the world is estimated as follows, according to the latest statistics:

South America	100,000,000
Australasia, including New Zealand	77,000,000
Europe	212,000,000
Africa	25,000,000
Asia	50,000,000
United States	45,000,000
Canada	3,000,000
All other countries	5,000,000
Total	517,000,000

In the United States the average yield of wool is about six pounds per head.