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ARTESIAN WELLS IN UTAH.

It has of late been discovered that flowing wells of water can readily be obtained by boring from one hundred to two hundred feet in depth in all that part of Utah lying northerly about one hundred miles and southerly about two hundred miles from Salt Lake City, and in the San Pete Valley.

This part of the Territory is thickly settled. Towns of from 500 to 5,000 population are numerous, and farmers and town residents are availing themselves of this abundant and easily obtained supply to the partial neglect of the old method of irrigating ditches.

A good flowing well will irrigate five or six acres, saving the expense of a yearly water tax and having the water daily at command, to be turned on or off as desired.

Nearly every residence in the beautiful city of Provo has its own artesian well, part of which is frequently utilized in a fountain in the front yard, throwing a copious jet thirty feet into the air, while hydrants are stationed at intervals in the garden, barn, and elsewhere about the grounds. For farmers and others it could also be used where light power for churning, sawing wood, thrashing, etc., is needed.

A stranger passing through a village, and not knowing the source of supply, would attribute it to a system of water works. The water is turned off and on by faucets, and is easily controlled.

The green lawns, the luxuriant gardens, and abundance of thrifty fruit and shade trees are in marked contrast to regions dependent on rainfall for their water supply.

These wells are being rapidly extended, and it is hoped that much of the Territory heretofore considered out of the reach of irrigation will soon be brought under cultivation.

SALT AT SALT LAKE, UTAH.

The manufacture of salt around the shores of Salt Lake, Utah, is an important and growing industry.

Nearly all the land adapted to the purpose has been appropriated by settlers.

A level meadow is usually selected, a few inches above and adjacent to the water of the lake.

The surface of the soil is scraped and made level and hard like the floor of a brick yard.

A storm or high wind will drive the water in from the lake and cover it, and a slight dam prevents its return. It quickly evaporates and leaves a residue of solid salt six to ten inches deep, that is shoveled into farm wagons and marketed.

This salt, owing to the considerable percentage of soda it contains, is not considered desirable for meat and butter, and does not command the price of a purer article, but is in general use in the Territory.

Its preservative qualities once cost a life insurance company $5,000.

A well-known resident of Salt Lake City, meeting with financial reverses, thought, it was supposed, to benefit his family by drowning himself in the lake. No trace of him could be found. The insurance company refused the insurance to the widow and orphans, as no proof could be brought of his death.

Three years afterward some hunters discovered the remains in a remote inlet at the westerly end of the lake, in a perfect state of preservation. They were easily identified by his friends, to the discomfiture of the insurance company.

MILITARY NOTES.

An interesting bit of news that crossed the ocean last week in the military journals was that concerning the new magazine rifle invented by Lieutenant Dohet, of the 14th regiment of the line, of the Belgian army. Save in length, it has much in common with our own "Colt" revolver, there being a revolving drum at the base of the barrel; the mechanism for loading, throwing out the empty shell and recharging being, however, quite different. The drum contains eight cartridges, according to *L'Avenir Militaire*, and the action of recocking the piece throws out the empty shell, turns the drum, as is the case with the ordinary revolver. But no sooner has the empty receptor clicked home in its new position, when, from a magazine in the small of the stock, a fresh cartridge is automatically shot into it, and so on till each of the remaining seven cartridges has been duplicated. This, as will be seen, makes the gun's total fire without reloading 16 shots, a veritable pepper box indeed; and when we remember that every man in a line of battle where such arms were used could fire sixteen shots in quick succession and then fall back to reload, only to make way for a second line similarly armed, the formidable character of the arm is apparent. In no gun thus far devised with a pocket magazine under the breech has the maximum been more than six shots, and unless the average soldier is able to detach the empty magazine and clap on another in very quick time, it would seem that this new Belgian piece has a palpable advantage. Indeed, should it prove as efficient as is promised, a dash through Belgian territory by either French or German may come to be looked upon as quite impracticable.

The Austrians are astonished at the remarkable accomplishment of the Maxim machine gun. The *Wiener Militar Zeitung*, commenting upon some recent tests made by the general staff of the Austro-Hungarian army, says of this gun:

It's more like a human being than a gun, and even this seems only scant praise, so accurate is the automatic apparatus; for indeed the average soldier could not be trusted to throw out the empty shells, put loaded ones in their places, and keep the cooling mechanism so constantly and evenly at work as is done with the power gathered from the recoil. Here is the record of the tests, the distances being given in meters:

Distance.	No. Shots Fired.	Time in Sec.	No. Shots to the Min.
200	30	3·0	600
400	30	3·0	600
600	40	4·3	558
800	40	4·3	558
1,000	40	4·0	600
1,200	40	4·0	600
1,400	60	5·8	620
1,575	60	6·0	600

The deliberate opinion of the Austrian officers making the test is reported by the authority quoted to be that this machine gun is superior to all others in quickness of firing and loading, though not so accurate as some others.

The sham battle between two British squadrons under the respective commands of Admirals Tryon and Baird is now, and likely for some time to be, the chief topic of discussion between artillerists as well as naval officers. The fighting capacity of the present type of armored ship may fairly be called an unknown quantity, for there have been no maritime wars since they were designed. It is, therefore, left for the judges to decide arbitrarily as to how near one ship may approach two of the same type without getting her *coup de grace*. But, aside from the pounding and ramming power of these great ships, which must needs wait for real war to find their exemplification, the steaming qualities, the facility in turning, in getting the guns to bear, in keeping the line of battle and in general maneuvering, may readily be measured in the present sham fight. The squadron under Tryon is constructing a great boom across the approaches to Berehaven, which recalls the really formidable boom the Confederates threw across the Mississippi above the bend; a portion of it being made of chains with links of three-inch iron, and welded across the center. The present boom is not likely to be stronger than that, and one torpedo boat or a steam launch with a few spar torpedoes and a skillful man to handle them will probably have little trouble of a dark night in cutting any temporary boom that can be constructed over deep water.

As usual in these sham engagements, the work of the torpedo boats is likely to be discredited, so that Jack may not have his confidence shaken in the invulnerability of the ship he sails in. Indeed, already comes the report from Lough Swilley, North Donegal, Ireland, that the torpedo fleet "behaved very badly on the way out;" only one out of the six getting in without mishap. But considering that these are not sea-going torpedo boats, being too short and too narrow for such service, it is saying much for them that they all got in, for there was a rough sea on the passage and more than half a gale behind it.

A New Barometer.

A uniform glass tube is sealed at one end and a thread of mercury introduced, inclosing a quantity of air. An observation is taken by noting the volumes, A and B, of the inclosed air (as indicated by the divisions on the scale), when the tube is placed vertically with its closed and open ends upward respectively. The height, H, of the barometer is given by the formula—

$$H = \frac{A+B}{A-B} l$$

where l is the length of the mercury column in the tube. For convenience l is made 10 inches. The whole instrument is very portable, weighing only six ounces, and measuring about 18 inches long.—*By Mr. T. H. Blakesley, M.A.*

Painting a Tin Roof.

Messrs. Merchant & Co., the extensive dealers in tin, recommend the following as an excellent paint for the purpose of painting tin roofs: 10 lb. Venetian red, 1 lb. red lead, 1 gallon pure linseed oil.

The substitution of benzine or fish oils for the pure linseed oil should not be allowed.

The roof will last longer and be less liable to rust if painted on the under surface before laying. It is a good plan to put one or two layers of felt paper under the tin to serve as a cushion for same, and to deaden the noise made by the rain falling on the tin.

A year after the first coating the roof should be painted again, and then a good roof will only require painting once in four years.

A roof of first-class material well soldered and properly laid should last forty years.

Sending Live Lobsters to California.

The United States Fish Commission shipped from Wood's Holl, June 16, 600 live lobsters and 250,000 lobster eggs. Of the former, 350 arrived safely in Sacramento, Cal., June 22, and they have been deposited in the Pacific north and south of San Francisco. Several previous attempts to take live lobsters across the continent have failed. Of those sent only as far as Chicago, packed in seaweed in crates, only one in four survives.

Colonel McDonald, fish commissioner, personally superintended the packing of the lobsters lately sent to California. A crate or box devised by the late Captain Chester was used. This was placed within another larger box, the intervening space being filled with pounded ice. In the inner box the lobsters were placed between layers of rockweed, which at times was moistened with sea water. Each box had an independent drain, so that the fresh water from the melting ice could not enter the lobster box. The temperature of the latter was kept at 45° F. A fish commission car was used, the boxes along the side of it serving as the outer box of the combination described above; one hundred crates, each containing six lobsters, being placed in them, and surrounded with ice. Each morning before sunrise a careful inspection of the lobsters was made, and those that had died were removed. The first day 45 died; the second day, 55. After that the mortality was much less. All of those that died were in an advanced state of shedding, and were in poor condition when they started.

One-half of the 350 lobsters that arrived safely on the Pacific coast were placed in the ocean north of San Francisco, and the other half south. It is hoped that this experiment may demonstrate the feasibility of stocking the waters of the Pacific on the California coast north of Monterey with this delicious shell fish. The condition of the water in that region is quite similar to that of the Atlantic off the Massachusetts coast. The temperature is about the same, except that it is more constant. The lobster on the Massachusetts coast crawls out into deep water in the summer, where the temperature is low, but it is thought that the equable temperature of the Pacific will enable the lobster in those waters to spend the whole year in one spot.

Hatching apparatus was taken to California with the 250,000 lobster eggs shipped. The young lobsters produced by these eggs will be deposited in the sea at once. Although a fair trial will be made to determine the possibility of stocking the Pacific by artificial propagation, much more confidence of success is expressed by Colonel McDonald from the introduction of mature lobsters. The young lobsters have to be placed in the sea almost as soon as they are hatched, and begin to feed most voraciously, even devouring each other. For a few days they swim on the surface of the water, where they find food suited to their requirements, but where they also encounter millions of enemies. After their walking or crawling organs are developed, they sink to the bottom, which they then make their home. One of the problems which the United States fish commissioner is now attempting to solve is the invention of some method of keeping the little lobsters in confinement and safety after they are hatched until they have attained sufficient strength and size to enable them to protect themselves. The importance of such an invention will be appreciated when it is known that, from the 12,000 to 15,000 eggs produced by a female lobster in a year, not more than two lobsters, when left to nature, become full grown. Not only are almost all the little lobsters destroyed by their enemies, but a large proportion of the eggs are devoured by fish and sea birds before they are hatched. If, after artificially hatching the eggs, the fish commission could protect the young lobsters until they are large enough to take care of themselves, the supply of lobsters, which is now hardly equal to the demand, and would not one-half supply it if the price was reduced, might be increased almost indefinitely.—*Science.*

Aztec Mummies.

Sig. S. Marghieri, the well known archæologist, discovered and explored a hermetically sealed cave, at an elevation of nearly 4,000 feet, on the eastern side of the Sierra Madre Mountains in Mexico, about 200 miles south of Deming, between Coralitos and Casa Grande, about two years ago. The floor was nearly smooth, the sides rough and rugged, and the vault covered with stalactites. In the far end of the cavern were found four desiccated human bodies.

The bodies were in a sitting posture, with the hands crossed on the breast, and the knees approaching the chin, with the head inclined forward. They were carefully shrouded in their burial garments, and placed facing the rising sun. The male and female were seated side by side. The older child, a boy, was at the right of the father, and the younger child, a girl, at the left of the mother. In addition to the funeral shrouds, the little girl was enveloped in the skin of an animal, similar to the method used in the island of Fuerte Ventura, the better to preserve its tender frame.

The floor of the cavern and the remains were covered with a fine dust, but no footprints of man or beast could be found. The bodies were carried to San Francisco by Signor Marghieri, and were purchased by J. Z. Davis, President of the Board of Trustees of the State Mining Bureau, and by him presented to the Bureau.

No embalming process was used in the preservation of these bodies. They were dried by the air alone. The bodies are not like those of the Indians of the present day, because the fingers and hands and feet are smaller than the average, and the woman's hair is brown and silken, and of the Caucasian type. The body of the man must have weighed in life from 180 to 200 pounds, but it now weighs only 14 pounds, while the body of the woman weighs only 12 pounds. In the lobe of each of the small and well proportioned ears is a piece of hollow bamboo or reed as an ornament. The woman had a large forehead and well developed reasoning powers.

The little boy weighs but three pounds, and the girl only four and a half pounds.

The burial shrouds on the bodies are composed chiefly of cotton, hair, hide, grasses, and the bark of willows.

The bodies may now be seen at the rooms of the State Mining Bureau.—*San Francisco Examiner.*

Electric Welding.

At the recent annual meeting of railway telegraph superintendents, the following paper on "Electric Welding," by Otis K. Stuart, was read:

The process of electric welding which was discovered by Prof. Thomson some eleven years ago, while lecturing at the Franklin Institute of Philadelphia, has been developed in the past two years to a far greater extent than is generally supposed. We started in with the welding together of small wires of iron and copper, and have been so successful in the development of apparatus that we are now able to weld bars of a very large size and of almost any shape or metal.

The principle involved is that of forcing through a conductor an amount of current that the conductor will not carry without heating. Any conductors, when placed in abutment, have as their point of greatest resistance the point of abutment or contact, and consequently it is at this point that the heat is first generated; and, as is well known, this heat increases the resistance of the conductors at that point so greatly that more heat is developed at a remarkably rapid rate.

A consideration of the above facts will prove at once one of the advantages of electric welding, as practiced by Prof. Thomson, namely, the localization of the heat to the points or point at which it is desired, thus saving an enormous amount of energy which is usually wasted in welding with the forge or flame. So absolutely is the heat localized, that pieces of iron 3 inches long and an inch in diameter can be welded together and then held in the hands for some time without any danger of burning, the only heat which is felt at all being that which is conducted along the metal to the hands after the welding is completed.

A further consideration of these facts will also demonstrate that it is possible by the Thomson process to weld any metal, including even those which melt at a very low temperature, such as lead, zinc, and tin, and those which melt at enormously high temperatures, as, for instance, iridium, platinum, etc. Of course it goes without saying that we can weld any of the metals used in ordinary manufacture.

It is plain that if the heat is developed so rapidly, a very delicate means of controlling it must be provided, and we are glad to say that we have been able to provide arrangements for this purpose which are almost absolutely perfect—I am inclined to say absolutely perfect for the reason that the control of the current can be made entirely automatic.

We are able to take a bar of inch iron, 4 inches in length, raise it to a dull red in 20 seconds, and hold it there for an indefinite period; to increase the heat to a bright red in a very few seconds and hold it there, then to still further raise the temperature to a welding or vaporizing point in a remarkably short space of time. This indicates the delicacy of this apparatus, and I would add that no very great skill is required to operate the machine, a boy learning to weld iron and steel with great facility in a week or two. The time required to weld metals depends, of course, upon the power of the apparatus and the skill of the operator. We have made strong and practically perfect welds in half inch round wrought iron in 6 seconds, in inch round wrought iron in 45 seconds, and so on. Experiments have proved to us that the power required to weld is proportional, or very nearly so, to the area of cross section of the pieces. This is true of nearly all the metals, though, of course, the relative resistance and welding temperature of the several metals may interfere with this ratio.

For welding small wires, such as telegraph or telephone, and the smaller sizes of electric light and power lines, the power required is very small indeed, the momentum of heavy machinery being more than enough to effect the weld. In this connection I desire to say that we are now working to perfect an apparatus for welding telegraph, telephone and electric light wire, and lines of pipe on the line. Our experiments in this direction have been successful, and we now think it possible to construct an apparatus which will be capable of being moved about by one or two men, which will make joints in wires correctly and durably, the energy used being supplied by storage battery or batteries, forming a part of the welding outfit. For repair work and in general construction it is our belief that this apparatus will be found very useful and effective. In fact, we hope to do away entirely with the ordinary solder and link joints used at present.

The policy of placing an apparatus on the market has been adopted for the reason that our patents cover not only the apparatus for electric welding, but the art or process as practiced by Prof. Thomson. It is hardly necessary to add that by the same process we can solder and braze, and anneal and temper, and do other heating, local or otherwise, which cannot be done economically by present methods. All these operations can be performed with the same apparatus, though, of course, it is better to have machines especially constructed for particular work.

Mr. G. L. Lang stated that he had seen one of these machines in operation when a bar of cast steel and one of copper were welded together. One would suppose that the metal most easily fused would burn away before the other was brought to a welding heat. This is not the case, however, and it is very simply provided against. The current is brought to the bars through clamps which grasp the bars near to the ends to be welded. Where copper and steel are to be welded together, the clamp is placed about 6 in. back on the copper bar, while it is only about 1 in. from the point of contact on the steel bar. In this case the heat is diffused through a large body of the metal which is most fusible, so that they are both brought to a welding point at the same time. The process is something really wonderful, and promises to revolutionize the ordinary method. The system is now in constant use at the Thomson-Houston factory in Lynn, Mass.

Improvement in Saccharin.

A great objection to saccharin is its very sparing solubility when pure. The defect is corrected by the addition of an alkaline bicarbonate, but it is often at the expense of the sweetening properties of the chemical, which sometimes acquires almost a bitter taste. Flies, bees, and other insects will not touch saccharin in any shape, but as man, who is not so good a judge of sweets, likes it, let it at least be cooked up and served to his taste. M. P. Mercier recommends the following process: Take of—

Pure saccharin	10 parts.
Distilled water	5 "
Sodium bicarbonate	4-5 "
Alcohol (95 per cent)	20 "
Sulphuric ether	sufficient.

The bicarbonate is to be added by small portions to the saccharin mixed with the water, about half an hour being allowed to pass between each addition, and the mixture being stirred occasionally to hasten the combination and the evolution of carbonic acid gas. It is important to cease adding bicarbonate before the saccharin is entirely saturated. The operation requires ten to fifteen hours. Next the alcohol is added to the mixture, with the effect of throwing down most of the soda saccharinate, and holding in solution the excess of saccharin and impurities; and, finally, the magma is thrown on a vacuum filter, where it is washed, first with more alcohol, and lastly with sulphuric ether. On drying in the open air, a white, exceedingly sweet, and soluble crystalline powder is obtained, which possesses all the properties of saccharin. Some of the chemical features of the foregoing processes may be briefly alluded to.

It will be noticed, for instance, that no heat is employed. The reason is that under the influence of heat soda will readily transform saccharin into salicylic acid. Then the use of bicarbonate instead of carbonate of soda is not indifferent, as the presence of caustic soda, always to be feared in carbonate, will turn the saccharin into a *para*-compound possessing no sweetness. Lastly, the use of alcohol as a precipitating agent renders heat unnecessary, and removes many impurities to be found in the purest commercial saccharin.—*Chem. and Druggist.*

Circulation of the Blood in the Eye.

"At Professor Hirschberg's clinic, in Berlin," writes a correspondent of the *Kansas Medical Index*, "my attention was called to the fact that the circulation of blood in the blood vessels of the cornea affected with pannus can be seen. If one could not see this in America, it might almost be worth a trip across the ocean. By the aid of a strong lens one sees the circulation here almost as well as in the web of a frog's foot or in a fish's tail."

TURPENTINE and black varnish, put with any good stove polish, is the blacking used by hardware dealers for polishing heating stoves. If properly put on, it will last throughout the season.