

of rounds have to be fired, the Martini-Henry is quicker than either. The term 'repeating rifle' is really misleading to the non-military public, and the name 'magazine rifle' is far more accurate. Many people seem to imagine that the repeating rifles fire continuously like a revolver, up to a certain number of shots, by merely pulling the trigger; but this is far from being the case. Each cartridge has to be extracted, and the breech closed as in the case of a single loader, the only time saved being that employed in taking a fresh cartridge out of the pouch and placing it in the chamber, while, when the magazine is emptied, it is necessary to refill it, cartridge by cartridge, thus wasting as much time as is occupied in loading the same number of cartridges direct into the chamber. The addition of a fixed magazine must of necessity make the rifle clumsy and awkward to handle, while it must either make the balance unequal or depend solely on a spring for its action."

How French Bread is Made.

One summer's day we stopped to call at the stone farm house of Monsieur Duval. Ernestine, the eldest daughter, was housekeeper in her dead mother's place, and she it was who brought out the amber-colored cider, the goat's cheese, and the heavy, hard, country bread. It is an essential of French peasant hospitality to offer these things to visitors.

The loaf she took from the shelf was one of half a dozen leaning against the black wall. These loaves resembled cart wheels, and had been baked in six-quart milk pans. Ernestine cut the loaf with a small saw made for the purpose! Nothing less than such a saw, or a pirate's cutlass, could sever that homely but wholesome *pain rassis*.

These loaves, we knew, were baked only once a month. Bread day in a Norman peasant family is like washing day on an American farm, in the respect that it comes at regular periods. We judged that bread day in this cottage was approaching, from the fact that only six loaves remained of the original thirty or thereabout.

After our luncheon Ernestine took us through the orchard to a picturesque stone building, where the bread was wont to be made. This building had once been part of an ancient abbey, and amid its ivy-covered ruins we could still trace fine sculpture and bits of armorial designs, but inside there was no trace of art or architecture. It was really a Norman hen house. We saw several pairs of *sabots* or wooden shoes hanging from the wall and looking as if they had been whitewashed.

In one corner of the place was a large space inclosed with boards. This was empty, but, like the *sabots*, it suggested whitewash or mortar making.

Ernestine told us that this was the family dough trough. Hither, once a month, came her father and the hired man to "set" the yeast a-rising. Flour and water were stirred together with the huge wooden spades shaped like our snow shovels which hung with the *sabots* upon the wall. When the mass, thoroughly beaten together, had risen and assumed a dark color and leathery consistency, then came the tug of war. The two men put on the *sabots* over their ordinary shoes, jumped in upon the dough, and began the kneading. Their way was to hop and prance and flourish like opera dancers, to stamp and kick like horses, exerting themselves till the perspiration streamed off them and they had no strength left. After this process the dough was put into the pans, and then baked in the huge oven at the rear of the abbatial hen house.

In all Norman towns half-clad men may often be seen lounging about bake house doors. Their legs and feet are bare and floury, and as they tread the streets we know that they have just come from or are returning to their usual occupation of kneading bread.

"*Mon Dieu!*" exclaimed Ernestine when we told her that in America bread making was woman's work. "*Mon Dieu!* how cruel your men are! I would rather shoe horses!"—*Epoch*.

Great Pumps.

The Lawrence Machine Company, Lawrence, Mass., have been awarded the contract for one of the largest pumping plants ever planned in America. The plant is for the city of Montreal, and consists of four centrifugal pumps, each with a discharging opening of 24 inches diameter, and capable of handling 18,000 gallons of water per minute, and four similar pumps of 15 inches discharge opening, and a capacity of 7,000 gallons per minute. Thus the four 24 inch pumps have a combined capacity of 72,000 gallons per minute, 4,320,000 gallons per hour, 103,680,000 gallons, or 386,000 tons, of water per day of twenty-four hours; and the four 15 inch have a combined capacity of 28,000 gallons per minute, or 1,680,000 gallons per hour. These pumps are contracted for by the Inundation Committee of Montreal, and are designed to pump the sewage of the city over the walls and dikes now in process of erection to protect the lower portions of the city from the annual inundation caused by the floods and ice gorges of the St. Lawrence River.

PHOTOGRAPHIC NOTES.

Instantaneous Photographs Made at Night.—With rapid plates of the present time, no trouble is found in taking instantaneous photographs by day light, but doing such work at night is something quite new. Messrs. Goedicke and Miethe, of Germany, recently succeeded in producing a flash of light of surpassing brilliancy and actinic force, by mixing an explosive compound of magnesium powder, chloride of potash, and sulphide of antimony.

Experiments show this compound to be rather dangerous, requiring especial care in its handling.

Quite recently, Dr. H. G. Piffard, of this city, a member of the Society of Amateur Photographers, carried on a series of experiments with a view of overcoming the dangerous qualities of the potash and magnesium compounds, and finally ascertained that a similar light of great power could be easily made by mixing with seven grains of gun cotton from fourteen to twenty grains of magnesium powder. There is no danger connected with this light. The gun cotton flashes instantly, as soon as ignited, and combines with the magnesium to produce an intense actinic light. The lens is used with full aperture, while the light is placed about ten feet from the object.

We were shown a negative made with this light which was quite remarkable for the density of the image and the detail exhibited in the dark portions of the object. Of course a plate of high sensitiveness had to be employed.

One of the Causes of the Fading of Photographs.—

The *Photographic News* finds that salts of iron in cardboard mounts have a deleterious effect on the photograph. It says: Iron, in one form or another, is present in every sample of dark-colored or buff card which we have examined, and it is with respect to the darker colored cards that we have received the bulk of complaints. In the case of some of these mounts, the iron is so loosely held that water alone will extract enough to strike a blue color with ferrocyanide of potassium; but in other instances the iron is not extractable by water alone, but readily comes into solution if a portion of the mount is treated with water containing a little hydrochloric acid.

The body of the buff-colored mount is generally made, for the sake of cheapness, of a pulp containing iron, this metal usually being in an insoluble state in the case of the individual sheets of which the card is built up; but in the process of mounting these sheets, the elements necessary to produce soluble iron compounds are introduced, as the paste or cement used almost invariably contains an appreciable portion of common salt (chloride of sodium), and, if not acid when used, generally becomes so before the sheets of cardboard are dry.

In such a case, the soluble and highly mischievous perchloride of iron is formed, and either makes the prints fade all over or works through holes in the enamel coating, and produces the spotted appearance so familiar to professional photographers. If the starch, paste, and gum for mounting the photograph become sour, the iron will be transformed into a harmful salt.

Testing for Iron.—A mount may be tested for iron in the soluble state by first making an infusion, that is, cutting up portions of the mount and soaking in warm water. If a few drops of a cyanide of potassium solution be added, a blue color should at once appear, provided any iron is present. A soluble iron compound may be considered in all cases as injurious.

To test for iron in an insoluble state, but in such a condition as to readily become soluble, pour fresh water on other pieces of the same mount, and for each drachm of water add two drops of pure hydrochloric acid, allow the whole to soak for an hour or two, and then filter off and test with ferrocyanide of potassium, as before. Iron in the condition indicated by this test may become soluble and mischievous, if the photographs are allowed to remain in a damp place, as then the paste used in making the card will probably become acid.

Very Queer Law.

If a decision just made by the Supreme Court of Connecticut is sound law, real estate on the banks of rivers with a tendency to change the course of their channels is a dangerous investment for capital. The court holds that rivers are natural boundaries, and when they alter their course their functions as boundaries are not affected by their former relation to lands. That no mistake may be made interpreting the meaning of the court, the decision gives a forcible illustration of a possible result from the waywardness of the river. "If," the decision says, "after washing away the intervening lot, it should encroach upon the remoter lots, and should then begin to change its movement in the other direction, gradually restoring what it had taken from the intervening lot, the whole, by law of accretion, would belong to the remoter, but now approximate, lot." Under this statement of the law an owner on the river front is not only liable to see his property gradually disappear under his own eyes, but if it reappears subsequently it belongs, not to him, but to his fortunate next-door neighbor.

Oil from Grape Seeds.

In Italy oil is now made from grape seed. According to the *Revue Francaise*, the following is the method employed. On being removed from the wine press the marc is well dried, the seeds are separated by a fan, and afterward subjected to a cleaning process.

When perfectly clean and well dried, they are ground like wheat. The finer the flour thus obtained the greater the yield of oil. The milling requires some attention as regards the arrangement of the millstones. As soon as the first product is withdrawn, it is bolted; that which is left on the bolting cloth is again ground, and so on, care being taken to add a little water to the flour as it passes between the stones. The product from the mills is then thrown into boilers. If ten kilogrammes, for example, are to be treated, in the middle of the mass, and into a hole extending to the bottom of the vessel, three liters of water are poured. The vessel is then placed over a slow fire; the flour little by little is stirred with the hand or with a spatula, to mix it well and to prevent the formation of lumps, and it is left over the fire until the hand cannot bear the heat of the mixture. This operation is very important. The better regulated the cooking of the flour, the greater is the quantity of oil obtained. The flour, still hot, is placed in wrappers, and is taken to the press and treated like other oil-producing seeds. After the first pressure the mass is broken down by hand and pressed a second time. One hundred kilogrammes of well-ripened grapes give from ten to twelve kilogrammes of oil.

Sulphurous Fumigations.

The Havre Congress of Hygiene have agreed to publish a set of directions for disinfecting, for the benefit of doctors or masters of infected vessels. Brimstone, broken up in small pieces, should be placed in broad and shallow earthenware or cast iron dishes, of about 1 liter capacity. The vessels should be of one piece, without solder, and, as a precaution against fire, should be placed in tubs holding 2 or 3 in. of water. To light the brimstone, either sprinkle it with a little alcohol or tip it with a little cotton wadding dipped in the same liquid. For each cubic meter of room, 30 grammes of sulphur are requisite, or about 1 oz. for each 40 cubic feet, all the openings being kept tightly closed for twenty-four hours. How to proceed when a large space is to be disinfected, and how to open the doors after fumigating, are described in detail, but one of the characteristic cautions given by the wise men at Havre is to avoid as much as possible, on board steamers, to let sulphur fumes get into the engine room—not that serious harm is to be apprehended, but because the vapors turn polished brass and steel an ugly red color, which greatly displeases the engineers.

The British Standing Army.

The "General Annual Return of the British Army" for the year 1886 has just been presented to Parliament. On the 1st of December, 1886, the composition of the *personnel* of the army was as follow:

| | | |
|-----------------------------|---------|--------------------------------|
| Officers..... | 7,204 | |
| Warrant officers..... | 687 | |
| Sergeants and farriers..... | 12,756 | N. C. O.'s and men 200,672. |
| Buglers, etc..... | 3,376 | |
| Rank and file..... | 184,540 | |
| Total..... | 208,563 | |

The nationalities of the non-commissioned officers and men of the army were as follows:

| | |
|--------------|---------|
| English..... | 146,171 |
| Scotch..... | 16,446 |
| Irish..... | 32,153 |
| Various..... | 3,487 |

Oxychloride of Zinc Cement.

This cement or mastic is prepared by mixing 1 part of the finest pulverized glass with 3 parts of oxide of zinc thoroughly calcined (made from the carbonate), which is afterward kept in well-stoppered glass vials. Separately 1 part of borax is dissolved in the smallest possible quantity of water, it is mixed with a solution of chloride of zinc of 1.5-1.6 sp. gr., and is kept in this state in well closed vials. To use this mastic, enough of the powder is mixed with some of the liquid to form a putty, which hardens readily until like stone. Under the name of Paris dental cement a similar preparation is sold in the pharmacies which has even been used for filling hollow teeth. This composition can serve excellently for many other purposes; for example, to attach to each other different parts of technical, scientific, or domestic appliances, where a tenacious, quickly hardening cement is required.—*L'Electricite*.

AN ingenious plan to save a dying pear tree was adopted in the garden of L. M. Chase, of Boston. The mice had girdled the tree so that it seemed bound to die. Mr. Chase planted four small trees around it, and close to it, cut off the tops, pointed the ends, and, making incisions in the bark of the pear, bent the small trees, and grafted them upon the dying trunk. They all lived, and that tree draws its nourishment from the small ones. This season a bushel of handsome pears were taken from it.