THE MANUFACTURE OF OLIVE OIL IN CALIFORNIA.

For a number of years past, the olive tree has been cultivated with varying success throughout the Southern States, and especially on the islands on the coast of Georgia and Florida and along the sea board of North Carolina. The quality of the product, however, not being the best, its manufacture has never assumed proportions of any magnitude, nor has it been able to compete with the oil imported from Europe.

A writer in the *Overland Monthly* publishes the information that the culture of the olive tree and the manufacture of oil from its fruit is gradually becoming a leading industry in California. The character of the climate, and the soil of the valley of Santa Barbara and of the foot hills of Santa Inez, for sixty miles along the coast, are adapted to the production of the finest varieties of oil. It is predicted that this portion of the State will eventually be numbered among the most celebrated oil districts of the world.

The olive is propagated almost entirely by cuttings taken from the sprouts and branches of mature trees at the time of pruning. The cuttings are generally from ten to fifteen inches long and from half an inch to three or four inches thick; the thickest are the best. These are placed in a perpendicular position in a bed of good soil, six, eight, or ten inches apart, their tops level with the surface. The earth is pressed closely around them, and their ends are slightly covered to protect them from the drying influence of the sun. Here they remain, throwing out leaves and branches, until April or May, when, with as little disturbance as possible of the roots, they are taken up and, after being trimmed to a single sprout, are set out in the orchard, in rows about twenty-five feet apart each way. The ground between the trees may be cultivated for several years, with little or no detriment to the young trees. When the olives are to be gathered, cloths are spread under the trees and the berries are pulled from their branches by hand and thrown upon the ground, or are beaten off with a long rod. If they are intended for making oil, they are carried to a dry room or loft and scattered upon the floor, or, where this is not convenient, a drying frame is made—consisting of broad shelves one above another, and sliding in and out as the drawers of a bureau—and the berries are spread upon the shelves. By this exposure to a dry, in-door atmosphere, the berries ripen further, their watery juices are evaporated, the oil is released and, when the skins have been broken, flows more readily under pressure. A slight mold may gather upon the berries during the few days that they remain here, but not sufficient to have an injurious effect upon the oil, or it may be prevented entirely by stirring the berries daily.

The process of extracting the oil, as practiced in Santa Barbara, is simple, even to mediæval rudeness. A large, broad stone wheel is held by an arm from a center post, and, by a horse attached to this arm, is made to traverse a circular bed of solid stone. The berries are thrown upon this stone bed, and are shoveled constantly in the line of the moving wheel until they are considerably macerated, but not thoroughly or until the stones are broken. This process finished, the pulp is wrapped in coarse cloths or gunny sacks, and placed under a rude, home-made screw or lever press. The oil and juices, as they ooze through the cloth or sacks, flow into a small tank, and, as they increase, are distributed into other vessels, from the surface of which the oil is afterwards skimmed. The oil flowing from this first pressure is that known as "virgin oil," and commands the highest price from connoisseurs of the table. Without further preparation the oil is now ready for use, except that, in order that any intrusive matter may be separated from the body of the oil and collected at the bottom of the oil cask or jar previous to bottling, it is set away for a time to rest. At the Mission of Santa Barbara, the oil is stored in huge antique pottery jars, that, ranged round the room, remind one of the celebrated scene of the jars in the story of "The Forty Thieves." The "second class oil" is the result of a second and more thorough crushing of the berries, in which even the stones are broken, and of a subsequent subjection of the pulp to the press. The berries are sometimes submitted even to a third process of crushing, and, previous to pressure, are brought to a boiling heat in huge copper kettles. The oil thus obtained is of an inferior quality, and is sold for use as a lubricator and also as an ingredient in the manufacture of castile and fancy toilet soaps, and for other purposes for which it is superior to animal oil. The residue of the berries is then returned to the orchard and scattered under the trees, and, possessing the qualities of a rich and rapid fertilizer, may be said to be yielded to us again revivified and luscious in the richer fruitage of succeeding years.

The tree, at five years of age, returns a slight recompense for care; and at seven an orchard should afford an average yield of about twenty gallons of berries to a tree. If there are seventy trees to an acre, there should be obtained from it one thousand four hundred gallons of berries. From twenty gallons of berries may be extracted three gallons of oil; and, if properly manufactured, olive oil will command $4 to $5 a gallon at wholesale. Thus, an average yield of olives, derived from an orchard covering one acre of land, will produce about $800 worth of oil. After deducting the entire cost of production and manufacture, a net profit may be anticipated of at least $2 per gallon; and thus, one acre, containing seventy trees, yielding an average of twenty gallons of berries, or the equivalent of three gallons of oil, each, will afford a surplus above all expenses of about $400 a year.

Olive culture is so simple that any one of ordinary intelligence may engage in it. The process of manufacturing the oil is an entirely different business, and belongs separate and apart from the cultivation of the olive. In time, it will not be expected, as now, that each grower shall be manufacturer also. As soon as the supply of olives in a neighborhood is sufficient to warrant the erection of suitable machinery for expressing the oil, every requisite for the purpose will be at hand. The olive grower's labors for the season will end with the deposit of his berries at the oil manufactory; and, according to the custom of the olive districts of Europe, one half the oil from his berries will subsequently be returned to him, ready for use and for market.

A large part of the oil sold in this country, and purporting to be olive oil of European manufacture, is the product of adulteration and imitation. It is generally manufactured in this country, and is composed principally of animal oil, though mustard seed oil and other inferior vegetable oils also form materials for its adulteration. Every housewife knows that olive oil purchased from the grocer, when exposed to a cold atmosphere, sometimes thickens and turns white or opaque in the lower part of the bottle; and every one familiar with the nature of olive oil knows that it retains its perfect transparency and uniform oily consistence under any temperature. Animal oil condenses under the influence of cold; but vegetable oil does not. This difference has been well noted on the shelves of stores where the genuine and the adulterated oil have been ranged for sale, side by side. The genuine oil glows clear beneath the glass in all weathers; the adulterated oil turns flaky with the cold, and the lard goes down with the fall of the winter's thermometer. It is an advantage, also, of the genuine "virgin oil," obtained by home manufacture, that it retains its perfect sweetness longer than any other oil. "Virgin oil," made at the Santa Barbara Mission four years ago, is to-day in possession of the nice delicacy of its first flavor when fresh from the berries.

IRON AS A MATERIAL OF CONSTRUCTION.*

There are three great divisions under which the material called iron is usually classified—malleable or wrought iron, steel, and cast iron; and of these there are endless varieties both as to quality and character.

Iron is never found in a chemically pure state, but always in combination with foreign substances, which it is the business of the manufacturer to get rid of as far as possible, as it is the presence of these impurities which deteriorates the metal. The ore, which is an oxide of iron, is first heated in a blast furnace with limestone and coal or coke, the carbon from the latter combining with the oxygen of the ore and allowing the molten metal to flow away, together with a "slag" composed of the earthy matters in the ore united with the limestone. The slag, being light, can be drawn off from the top of the molten metal, which is afterwards run out of the bottom of the furnace into furrows made in sand, and broken up into convenient lengths called "pigs."

Chemically pure iron, even if it could be obtained, would be much too soft for purposes of construction, and it is therefore necessary that a small quantity of carbon should be always combined with the metal to render it hard and strong; the proportion in which carbon combines with iron varies from ¼ per cent to 6 per cent. In order that iron may be malleable, or readily worked by the hammer, it must not contain more than ½ per cent of carbon; and from this proportion up to 2 per cent of carbon in combination gives us steel. If more than 2 per cent of carbon is present, we obtain cast iron, the brittleness of which increases with the proportion of carbon with which it is impregnated, 6 per cent being the highest that it is possible to combine with it.

The minerals silicon, sulphur, and phosphorus are found combined in greater or less proportion with all iron, and these impurities must be got rid of as far as possible, since their presence tends to weaken the metal.

Malleable iron is obtained from the "pig" by the process of "puddling," or exposing the molten metal to the action of the air, by which the greater part of the carbon is carried off, the metal being stirred until the above named impurities are got rid of, and a spongy character is imparted to it. The iron is then removed from the furnace to the squeezer, or hammer, by which the remainder of the slag is forced out, and the metal can then be placed between rollers and drawn out into flat bars. When bars or beams of large size are required, the puddled bars are piled up together, heated to a welding temperature, and passed several times through grooved rollers, the size of the groove diminishing each time until the required shape and size is obtained. By this means bars of any required section and length can be obtained.

CAST IRON.

Cast iron is obtained by merely remelting the pigs, and pouring the metal into sand molds made to any required form. The quality of the metal is improved by frequent meltings, which remove the impurities, and for good work a third melting should be used; the strength is also increased the longer it is kept in a state of fusion. It is desirable to mix the pigs from different ores, as well as those obtained from different meltings.

To obtain great hardness, the castings must be chilled or cooled rapidly, the surface metal which cools first being always harder and closer in texture than the interior, where the castings are of large size.

The tensile strength of cast iron, or its power to resist a direct strain applied to stretch it in the direction of its length, is small as compared with its crushing strength, as well as with that of malleable iron; 7 tuns being about the average force that will break a bar 1 in. square, although some bars, that had been carefully prepared and kept in a state of fusion for several hours, bore double this amount of strain It is in its resistance to crushing that the great value of cast iron as a building material lies; experiments upon a large number of cylinders, ¾ in. diameter and 1½ in. high, gave the crushing strength per square inch from 27 tuns to 54 tuns, or an average of 38 tuns, the specimens shortening from $\frac{1}{10}$ to $\frac{1}{20}$ of their length before crushing; the ultimate tensile strength was found to be about $\frac{1}{6}$ of the crushing, the elongation being about $\frac{1}{600}$ of the length.

The transverse strength of cast iron beams is very variable, being greater in proportion in those of small size than in large castings. No sensible diminution of strength takes place in cast iron, if heated up to 600° Fahr., but beyond that temperature it gets rapidly weaker.

The ratio of the "working strength" of cast iron to its ultimate strength is as 1 to 3, or 1 to 4, for a stationary load, and 1 to 6 for a moving load, as in the case of a railway bridge. If the load is kept within the working limits, a beam of cast iron does not lose strength by a continuance, however long, or a repetition, however often, of the same load.

The average specific gravity of cast iron is 7·1, or it weighs 7,100 oz. or 443 lbs. per cubic foot. One cubic inch weighs ¼ lb, so that to find the weight in pounds of a casting, divide the number of cubic inches it contains by 4.

The great advantage of cast iron is that it can be made into any required shape; and when many copies of the same form are wanted, they can be supplied at a very moderate cost as compared with malleable iron. It has, however, the disadvantage of not being trustworthy, and is liable to unsoundness from unequal contraction in cooling, which causes some parts to be more dense than others; this can only be provided against by allowing an excess of strength in the castings. Its brittleness also unfits it for use where it would be subject to heavy concussions or sudden changes of load; this can, however, be obviated by a process of annealing, which produces

MALLEABLE CAST IRON.

The castings are first made in the usual way from soft and pure charcoal pig, and kept red hot for some days in powdered red hematite ore, by which most of the carbon is extracted, and the metal is converted into malleable iron; th expense, however, of this process prevents it from being use for any but small castings, of which a large number are required. Cast iron does not oxidize (rust) so readily as wrought iron when exposed to the weather, but the continued action of sea water is to convert it into a soft porous mass which readily crumbles to pieces.

WROUGHT IRON.

Wrought or malleable iron is the metal in its purest condition, and with the greatest proportion of carbon and other foreign matters removed in the process of manufacture When a wrought iron bar is broken by a tensile strain, applied in the direction of its length, it contracts in sectional area at some point before fracture, the amount of contraction depending on the quality of the metal, and being as much a 50 per cent in some specimens. The average resistance to fracture or tensile strength is about 25 tuns per square inch of original section, and no wrought iron ought ever to be allowed in a structure which will not stand at least 20 tun. per square inch.

When a compressive force is applied to wrought iron, it will stand about 9 tuns per square inch before any perceptible change takes place in the form, but beyond this it becomes distorted and yields like a lump of lead, its ultimate crushing strength being about 16 tuns per inch. The tensile strengt of rolled plates is 10 per cent less across the grain or direction of fiber than with it, and the ductility is about one half.

Wrought iron may be considered as perfectly elastic as long as the tensile strain does not exceed 10 tuns per square inch of section, the metal returning to its original shape and size when the strain is removed without any "set" or visible change of form; beyond this amount the extension becomes permanent, the limit of elasticity, which may safely be taken at about half the breaking weight, being passed. If a slight permanent set is produced when a load is first put on, this set will not be increased by any number of repetitions of that load, but each time the force is removed it will return to the form it assumed after the first loading, provided the limit of elasticity is not passed. For every tun of load per square inch up to 10 tuns, the extension is $\frac{1}{12500}$ of the length.

When wrought iron is subjected to a compressing strain, it is reduced $\frac{1}{10000}$ of its length for every tun per square inch up to 13 tuns, beyond which the amount of compression increases more rapidly; so that up to the limit within which this material ought to be strained in practice, whether in tension or compression, it may be assumed as perfectly elastic, the modulus being 10,000 tuns per square inch of section.

The toughness of wrought iron renders it useful for railways, machinery, armor defences, and wherever capability of resisting shocks and irregular strains is required; there is, however, great variety in the hardness of the metal, the soft irons being considered most valuable for withstanding heavy concussions or vibrations.

When a piece of wrought iron is broken suddenly, it generally presents a crystalline fracture, but if the force is applied gradually, the appearance is fibrous or silky; the fibers are, in fact, the crystals drawn out by the process of rolling or hammering. A crystalline fracture indicates hardness, while a fibrous fracture is a mark of softness and ductility; the finer and more uniform the crystals, the higher the quality of the metal. As might be expected from the process of manufacture, the specific gravity of wrought iron is highe than of cast, being usually taken at 7·68, a cubic foot weighing 480 lbs., and a plate 1 in. thick, 40 lbs. per foot super. A bar 1 in. square and 1 yard long weighs 10 lbs.; so that the

*Lectures at the Royal School of Naval Architecture. By William Pole, F.R.S.

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weight of a lineal yard of any section of bar is found by multiplying the square inches in the section by ten.

It is generally found that large masses of forged iron do not possess the relative strength of smaller ones, from being irregular in texture. Rolling improves the toughness more than hammering does, the latter processes hardening it, but at the same time rendering it more brittle.

Wrought iron can be case-hardened by heating it for some days in contact with bone dust or other animal substance containing carbon; by this process the surface becomes converted into steel by the absorption of carbon.

If heat is applied to wrought iron, its strength is not affected as long as the temperature does not rise above 350° Fahr., but beyond that it begins to lose strength. When the temperature is reduced very low, the metal becomes less flexible and more brittle, so that its deflection under a given load is diminished, but at the same time its liability to fracture is increased.

The decay of iron arises from the joint action of air and water, the oxygen from which combines with the metal and forms a hydrated sesquioxide, called rust.

THE PNEUMATIC DESPATCH.

It is now nearly seven years since a pneumatic tube was first laid in the very heart of London, and its working proved to be perfectly successful. Notwithstanding this, the fact remains that the great public carriers—the railway companies—and the Post Office authorities have not yet availed themselves of the manifest advantages offered by this system for the rapid transmission of small parcels and mail bags. It is true that for some time the only available route was that from the North Western Railway at Euston square to the station of the Pneumatic Despatch Company in Holborn. It may have been that the value of the system was impaired by the southern termination of the tube being in a locality possessing but few advantages for those who were likely to be the principal users of the system. But the terminal point was never intended to be in Holborn, nor is it, inasmuch as a line of tube—long ago commenced—has recently been completed between the Holborn station and the General Post Office. The possible drawback to which we have referred, does not, therefore, now exist—if it ever did,—a clear route having been established between Euston square and St. Martin's le Grand. Descriptions of the pneumatic tube and the apparatus for working it were given by the press in November, 1865, when the first section was opened. It will be as well, however, now that the works have been finished, if we briefly refer to them again. This will be the more necessary, as the details have been slightly altered in one or two instances. The pneumatic tube is formed in two sections, with a station in Holborn. The first section—that between Euston and Holborn—is 3,080 yards in length, and is laid with easy gradients. The section between Holborn and the Post Office is 1,658 yards in length, and on it two gradients of 1 in 15 occur. [The total length is almost three miles.] The station at Holborn is placed at right angles to the direction of the tube, so that all through trains must reverse there. This is effected by allowing a train on its arrival to run from one tube up an incline, down which it quickly descends by gravity, and is turned on to the pair of rails leading to the other tube. This shunting is effected very rapidly, occupying only about half a minute. The tube is of the horse shoe section, the internal dimensions being 4 feet 6 inches vertically, and 4 feet horizontally. The pneumatic cars or trucks are 10 feet 4 inches long, and the ends present an outline conforming to that of the interior of the tube, the edges of the ends being bound in an elastic medium, so as to form pistons when in the tube. The cars weigh about one tun each.

The machinery by which the transit of the carriers is effected was designed and constructed by Messrs. James Watt & Co., and is placed in the rear of the Holborn station. It consists of an engine having a pair of 24 inch cylinders with 20 inch stroke. A fan 22 feet in diameter is geared at 2 to 1 with the engine, and is worked continuously, the alternate action of pressure and exhaustion being governed by valves. The ordinary working speed of the fan is 160 revolutions per minute, which gives a pressure of about 6 ounces per square inch. Trains are drawn by exhaustion from Euston square and the Post Office, and are propelled by pressure to those points. The doors of the tubes are arranged at Holborn and the Post Office on the principle of lock gates, being hinged vertically and hung in pairs.

Such is in general terms the machinery of the Pneumatic Despatch Company, the working of which was illustrated to a number of scientific gentlemen and others on Monday last. Among those present were the Duke of Buckingham and Chandos (Chairman), Mr. John Aird, Mr. G. S. Sidney (Directors of the Pneumatic Company), Mr. W. H. Barlow (Engineer to the Midland Railway Company), Mr. Winter (Engineer to the Post Office), Mr. Giraud, Mr. T. G. Margary (Secretary of the Pneumatic Company), Mr. S. de Wilde (representing Mr. L. Clarke, the Company's engineer), etc. The trials commenced by bringing a single car by exhaustion from the Post Office, the run being accomplished in 3¼ minutes, a rather longer time than usual, but accounted for by the circumstance of the car having been over buffed, the pressure being relieved a little too soon. This car was then coupled to two others, and the three were started on their way to Euston, which point they reached under pressure in 6¼ minutes from the time of leaving Holborn. The train was next brought from Euston by exhaust, the time occupied being 5½ minutes. It was then run into the Post Office tube, and in 2½ minutes from the time of starting it had reached its destination. It was then sent on the return journey, which was accomplished in 3 minutes, as far as Holborn, and in 7 minutes more it had arrived at Euston. The time here was exceptionally long, but the pressure was rather low. Finally the train was brought back from Euston in 5¼ minutes.

Experiments of such short duration as the foregoing, carried out, moreover, without any recent practice by the men in charge, can hardly be taken to represent the results of actual practical working. Some interesting facts, however, in connection with continuous working were established by Mr. W. H. Barlow, who in the early part of the present year instituted a series of careful experiments with the pneumatic tube, which lasted over several days, and showed the difference of power required to work the gradients of the Euston section of the tube as compared with the Post Office section. One feature proved by these experiments was, that whether the tube was closed at both ends or closed at one end and a car inserted and fixed at the other, or whether a train was moving or not, and again whether each tube was put in connection with the fan separately or both were put in connection with the fan at the same time, in all these cases there was—as might be expected—but little variation in the number of strokes required to maintain given pressures.

With regard to the actual weights moved, and speeds obtained, numerous experiments were made by Mr. Barlow on the section between Euston square and Holborn.

The remarkable feature of these experiments is that, with the same number of revolutions per minute of the engine, and the same pressure, a very large increase made in the load produced a comparatively small decrease in the speed.

By increasing the load from two to twelve tuns, the useful effect or weight passed through per minute was increased five times. In the last experiment, by increasing the load from two to twenty tuns, the useful effect was increased about seven and a half times; the pressure of steam and the work performed by the engine remained about the same, whether a weight of two tuns was passing through at 17·3 miles per hour, or twenty tuns at 13·15 miles per hour. The experiments made by Mr. Barlow upon the section of tube between Holborn and the Post Office showed that, notwithstanding the gradient of 1 in 15, the heaviest loads were those which produced the best commercial results.

The working expenses are estimated at £50 per week, working 12 hours per day, and the repairs at £500 per annum, an allowance which Mr. Barlow considers to be ample. He, moreover, observes that if sufficient traffic could be found to render it desirable, the carrying power of the apparatus could be greatly increased.

Seeing then that there exists in good working order a rapid and efficient means of transit between Euston square on the one hand, and the Post Office and the receiving houses of the principal carriers in London on the other, there can hardly be a doubt that these means will soon be utilized by those parties whom they would so clearly benefit. Useful as the system appears to be as at present arranged, it could be rendered infinitely more useful by a slight extension. It already has one of its *termini* at the North Western Railway, and we know of nothing to prevent its further extension eastwards to the Midland and Great Northern Railway stations. Such Such a step would appear to be most desirable, and we should think that the two last named companies would find it greatly to their interest to enter into working arrangements with the Pneumatic Despatch Company. This would afford a ready solution to the difficulty which the Company now experiences in obtaining sufficient traffic to start their line. Were such arrangements as we have suggested carried out, the additional length of tube would be forthwith constructed, and from what we have seen of the satisfactory nature of the working of the system, it would thereafter be rapidly extended in all directions under the metropolis and its suburbs.—*Engineering, Aug.* 23.

New Method of Telegraphing.

A patent recently granted to J. H. and J. W. Rogers, of Peekskill, N. Y., covers the following method of telegraphing:

The inventors provide a thin and narrow conducting tape or strip of metal, on which they emboss the message in the Morse characters, and this strip they draw through a transmitting instrument, which is so arranged that a metallic pen, or *stylus*, which is in communication with one pole of the battery, will only touch the upper surface of the characters, as the strip passes along through the machine. The under surface of the strip or tape is in communication with the other pole of the battery; consequently whenever the *stylus* comes in contact with an embossed character or signal, the electrical circuit is closed and a signal, corresponding to the embossed signal, is transmitted over the line wire, to the receiving instrument at the opposite end. The receiving instrument may be made on the plan of the Morse instrument, and is intended to be so arranged that it will indent or emboss the signals, as fast as received, upon a metallic strip like that used in first sending the message. Several advantages attend this method of telegraphing and recording. The transmission of messages once formed can be much more rapidly effected than heretofore.

The means for forming the raised letters on the conducting tape are, or may be, substantially the same as those now employed in printing telegraphic messages on the Morse system—that is to say, by the ordinary needle or recording pin of the register. The forming of the raised letters can consequently be effected at any suitable distance by the ordinary telegraphic appliances, and thus supply the place of repeaters. If, for example, in sending a message to California from New York, the wire beyond Chicago should be engaged, then (assuming the wire to be disengaged from New York to Chicago) the automatic repeater is of no use until the wire beyond Chicago can transmit its message; but the improved tape catches and holds the message at Chicago until the wire beyond may be used, and thus from fresh batteries repeats the messages from New York on to California at least ten times as rapidly as an automatic repeater could, leaving the wire from Chicago back to New York free for other messages to New York; which the ordinary automatic repeater cannot do, acting simultaneously, as it must, with the New York manipulations.

Again, to say nothing of the automatic repeaters, all the messages arriving at a central office—as, for example, the Western Union in New York—may be delivered there on the tape by each distant manipulation of other offices, instantaneously, and all these may be transmitted on to their destinations by turning a wheel, whereas now an expert must forward each message to which the wires beyond New York were not opened.

Japanese Fans.

In summer time the climate of Japan is generally moist, hot and oppressive, the air on the hottest days being not unfrequently stagnant as well; the consequence is that the use of the fan is universal, and in bamboo and Japanese paper are found materials most admirably adapted for the purpose of their manufacture. The artistic faculty of the Japanese embellishes their fans with designs that commend themselves by their exquisite fidelity to Nature; a few simple touches realize pictures which many a foreign artist could not approach; the Japanese are born draftsmen, and their sense of the contrast of colors intuitive; hence even the very commonest fans are generally very interesting to look at, and are almost never vulgar. The excellence of this branch of native manufacture, and the excessive cheapness of production, says the Japan *Herald*, are fast securing a foreign trade in them of no mean magnitude. Within the last year one commercial house shipped some three millions of them to America, and another firm is just shipping away, in one vessel, a million more to the same country, where it has become a common practice to deposit a fan in each sitting in churches and chapels, for the use of members of the congregation. There are some extensive factories at Yedo devoted to fan making, giving employment to hundreds of hands. The fans being wholly produced by manual labor, no machinery is employed.

A Tame Wasp.

At a recent meeting of the British Association, in Brighton, in the section of zoology and botany, Sir John Lubbock exhibited a tame wasp which had been in his possession for about three months, which he brought with him from the Pyrenees. The wasp was of a social kind, and he took it in its nest formed of twenty-seven cells, in which there were fifteen eggs, and had the wasp been allowed to remain there, by this time there would have been quite a little colony of wasps. None of the eggs, however, came to maturity, and the wasp had laid no eggs since it has been in his possession. The wasp was now quite tame, though at first it was rather too ready with its sting. It now ate sugar from his hand and allowed him to stroke it. The wasp had every appearance of health and happiness; and although it enjoyed an "outing" occasionally, it readily returned to its bottle, which it seemed to regard as a home. This was the first tame wasp kept by itself he had ever heard of.

Bullock's Blood as a Medicine.

In the practice of medicine, as in other worldly matters, certain things are in fashion for a certain time. Bleeding and mercury have had their day; cod liver oil and chloral hydrate are already on the wane; alcohol and bullock's blood are now in vogue among the Parisians—the former for fevers and all inflammatory affections, and the latter for anæmia and pulmonary phthisis. It is said to be a curious sight in Paris to see the number of patients of both sexes and of all ranks and ages who flock to the slaughter house every morning to drink of the still fuming blood of the oxen slaughtered for the table. According to M. Boussingault, of all nutritive substances the blood of animals contains the greatest quantity of iron, and it is this which gives value to the new medicine.

Elevations in Colorado.—Collated by Professor C. Thomas, of the United States Geological Survey.

Names of Points.	Altitude above the sea. Feet.	Names of Points.	Altitude above the sea. Feet.
Mount Harvard (Whitney)	14,270	Jones's Pass	12,400
Gray's Peak	14,145	Argentine Pass	13,100
Mount Lincoln	14,123	Georgia Gulch Pass	11,487
Mount Yale	14,078	Ute Pass	11,200
Pike's Peak (Parry)	14,216	Vasquez Pass (estimated)	11,500
Long's Peak	14,056	Hot Springs (Idaho City)	7,050
Barry's Peak	13,133	Hot Springs (Middle Park)	7,725
Mount Flora	12,878	Soda Springs (near Pike's Peak)	6,515
Mount Wright (E. Berthoud's Pass)	11,800	Gold Hill	8,636
Cherry Creek Divide	7,575	Bergen's Ranch (Jefferson Co.)	7,752
Denver	5,317	Jefferson, South Park	9,842
Golden City	5,882	Tarryall	9,943
Mount Vernon	6,479	Foot Berthoud's Pass	9,325
Golden Gate	6,226	Osborn's Lake	8,821
Junction N. and S. Clear Creeks	6,466	Velie's Peak	13,456
Black Hawk	7,543	Mount Audubon	13,402
Central City	8,043	Timber Line (Parry).	
Missouri City	9,073	On Pike's Peak	12,000
Head Virginia Cañon	9,690	On Snowy Range	11,800
Idaho	7,149	On Mount Audubon	11,325
Georgetown	8,245	On Long's Peak	10,800
Berthoud Pass	10,896	On Wind River Mountains	10,160
Boulder Pass	11,670	On Gilbert's Peak (Uinta Mountains. Hayden's Survey)	11,100

FOREIGNERS IN JAPANESE EMPLOY.—From the *Nishi Shinjishi*, the Yedo newspaper printed in Japanese, we glean that the Public Works Department of that country employs 161 foreigners, at an aggregate cost of 29,621 dollars a month. They consist of French, 36 persons; English, 111; Swiss, 1; Chinese, 6; Manillese, 4; Indian, 1; and Americans, 2.

PLATING WITH NICKEL.—This may be effected by placing the object to be plated, whether of iron, steel, copper, bronze, zinc or lead, in a boiling neutral solution of zinc chloride containing a salt of nickel, and granulated zinc. If the zinc solution is acid, the coat of nickel is dull. A plating of cobalt may be made in the same manner.

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