A NOVEL METHOD OF DOG-SHEARING.

Considerable surprise has recently been caused on the banks of the Seine in Paris, by the appearance of a perambulating outfit for shearing dogs, a practice quite generally in vogue in the French capital. The accompanying engraving clearly illustrates this enterprising institution. It consists of the usual mechanically-operated shearing apparatus, a small 2½-horse-power gasoline motor to drive the former, and a rough carriage on wheels, upon which the motor and the other mechanism are mounted. By means of this outfit six dogs per hour can be sheared, and it is said that the originator of this peripatetic business is making a decided success of it. There seems to be little doubt that before long this means of dog-clipping will be generally adopted.

Los Angeles's Giant Water Scheme.

One of the most extensive projects for securing a water supply as well as electric power which has yet been outlined by engineers, is a plan by which the city of Los Angeles will obtain water in future for domestic purposes. As is well known, the question of water is one of the most important in the West and Southwest, owing to the climate and topography of the country. At present Los Angeles depends upon a single water course. The volume from this stream is sufficient for the present needs of the people, but the city authorities have determined to obtain sufficient for an indefinite period. The engineers called into consultation have made a thorough investigation of the various streams and lakes in Southern California, and have decided that the most practicable for the purpose intended is located in Inyo County. Inyo County includes Owens Valley, which the river of this name traverses. The watershed embraces about 2,000 square miles in area, capable of furnishing a volume of water from which a flow of 600 cubic feet per second can be supplied continuously when the storage system is completed.

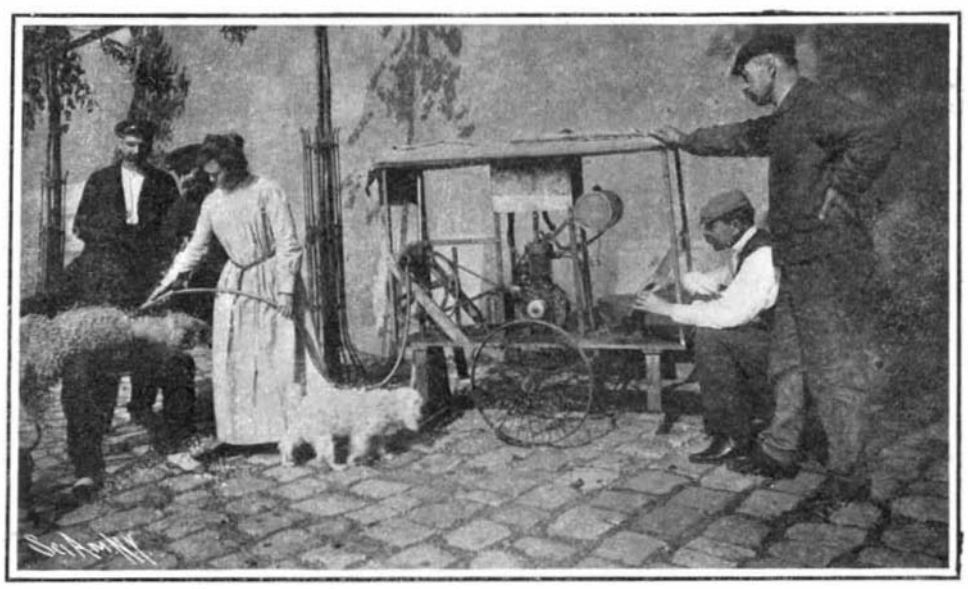
The watershed in question, however, is located in the extreme eastern section of the State, so that it will be necessary to construct a conduit over 200 miles in length. The exact distance estimated by the engineers is 209 miles. When completed this will be probably the longest conduit of its kind in the world, the only one approaching it in length being a canal constructed in the Coolgardie mining territory of Australia. The distance in a straight line from Los Angeles to the valley of Owens River is 175 miles, but the route will make a considerable detour in order to avoid ranges of mountains which form the western side of the valley. As it is, however, no less than ten miles of tunnels must be constructed in order to complete the work, while for a considerable distance the conduit will be built upon an elevated structure of concrete or other supports.

This notable aqueduct will be fourteen feet in width and of dimensions sufficient to deliver the quantity of water referred to when necessary—600 cubic feet per second. It will be supplied from a reservoir which will be constructed across the Owens River at a point some distance from its mouth, where a dam can be constructed at a minimum expense. Already the city has secured the necessary riparian rights, and work upon the reservoir will be begun in the near future. The project is of such magnitude, however, that it is estimated fully five years will be required to complete the conduit and reservoir, and the terminals in the city. The conduit itself will be composed of concrete.

As already intimated, the city will not only secure a water supply, but also a very extensive horse-power for manufacturing and other purposes. As the valley of Owens River is at a considerable elevation above Los Angeles, no pumping stations will be needed. As a matter of fact, the elevation of the valley is no less than 4,200 feet. It is calculated that with a volume of water averaging 600 feet a second flowing through a conduit of the dimensions referred to, fully 60,000 horse-power can be obtained. This will be utilized for generating electric current through a series of turbines connected with the necessary electrical units. Consequently one of the greatest advantages, aside from the ample supply of water for domestic purposes, will be cheap power. As is well known, Los Angeles is the center of several important interurban electric lines, while it has probably a greater mileage of trolley lines within its limits than any community of its population in the United States. It is intended to employ this current largely for transportation purposes, although a considerable horse-power will be available for manufacturing as well as illumination, if desired.

The cost of the system is estimated at $23,000,000, but it has met with such favor that already arrangements have practically been made by which bonds for this amount will be taken at 4 per cent interest. The cost of securing the riparian rights was $1,500,000. The question of raising this sum was decided at a recent election, when the vote in favor of it was almost unanimous. At present the city requires a flow of about 80 cubic feet per second for domestic purposes, consequently with the proposed system it will have over seven times the volume needed at present, but as in the case of New York the people have decided to provide for the future, and it is calculated that the valley referred to will be sufficient for the requirements of a million population. Compared with other waterworks systems of magnitude, that of Los Angeles is far greater than any other in the world, considering the number of its inhabitants.

Hitherto the water of Owens River has been used chiefly for irrigation purposes, and in this connection some interesting statistics have been compiled by the engineers showing the value of a certain quantity applied in irrigating various crops. For example, one and one-half miner's inches are required to grow an acre of alfalfa in the valley. The yield of an acre in a season averages about six tons, one inch of water producing four tons. The growers secure about $10 per ton, consequently the returns from an inch of distribution net $40 in a season. It has been found, however, that in the vicinity of Los Angeles one inch of water is sufficient for five acres of orange trees. The average harvest of this area represents from 1,200 to 1,500 boxes of fruit, which in an ordinary season sell at a rate of $2.25 a box. Therefore the use of the water for orchard irrigation is of enormous value compared with the irrigation of the alfalfa field. As the percentage of surplus water will be very large for a long period, it is intended to utilize this for irrigation in Southern California, so that while the cost of obtaining it will be very large compared with the water supply usually furnished American communities, the returns from the sale of electric power, of irrigation rights, and for domestic use, it is calculated will well repay the outlay incurred. The city authorities have been encouraged in carrying out the plan by the Chamber of Commerce of Los Angeles, which has been active in promoting the scheme.



A NOVEL METHOD OF SHEARING DOGS.

Spontaneous Ignition of Piles.

A remarkable case of spontaneous ignition that recently occurred in erecting the walls of the new Rotterdam quay is related by the Technische Rundschau.

Morrison rams had been in use there for some time, which by 180 to 200 strokes per minute of the falling ram caused a steady advance of the piles. The foundation was such that the pillars had to be driven through the quicksand down to the solid ground.

On withdrawing some piles, the points of the latter were found, owing to the enormous friction, to have been charred entirely and heated to such a point as to begin burning spontaneously on coming in contact with the air; nor could iron shoes prevent this spontaneous ignition.

It may be said that when leaving the piles in the ground this ignition would not result in any damage, the charring remaining confined to the surface, and the heat being rapidly carried away in the moist surroundings.

The British zoological gardens have recently acquired two specimens of the rare talapoin monkey. The talapoin, which receives this name owing to its fancied resemblance to a Siamese priest, is the smallest of the group of green monkeys (so called from the general olive tint of the fur) and is about the same size as a squirrel. The head is round, with large ears, the face is brightly colored, the naked skin around the eyes is orange, and the upper lip and drooping whiskers straw-yellow.

THE SALMON FISHERIES OF THE NORTHWEST.

BY DAY ALLEN WILLEY.

The "run" of the salmon in the waters of streams entering the Pacific Ocean in the Northwestern States corresponds to a certain extent to the movements of the shad from the Atlantic up such rivers as the Hudson, the Susquehanna, and southern watercourses. The Pacific salmon, however, is much larger in size, and, as is well known, forces its way to the headwaters of the stream which it enters, frequently overcoming a very swift current and leaping up waterfalls six feet and more in height.

It has been demonstrated by experiments made by the United States Fish Commission that the salmon hatched out on a certain watercourse always returns to it or to an adjacent watercourse after maturity, and apparently endeavors to reach the locality of its first home. Fish which have been marked to identify them have been found in or near the waters which they left before reaching maturity. Frequently the salmon is so exhausted by the journey upstream, which is sometimes hundreds of miles in length, that it floats into shoal water and dies if it is not captured. During the season of the salmon run, it is a fact that some of the creeks in the State of Washington connecting with the sea have been so filled with dead and dying fish that the waters were polluted for the time being.

Advantage has been taken of this habit of the salmon to catch it with a device which is decidedly unique in its construction and operation. It might be termed an automatic net, since it not only catches the fish, but delivers it into the receptacle from which the salmon is taken to be prepared for market. The net is employed principally upon the Columbia River, where hundreds are in use, especially in the vicinity of the Dalles and above this formation. As the wheel is operated entirely by the current of the river, it must be placed where the movement of the water is sufficiently rapid to revolve it. The salmon wheels are of two kinds, one having a movable base and the other fastened to the shore or to cribwork projecting from the bank. The shore wheels are by far the largest, some of them being fully fifty feet in diameter. As the illustrations show, they are not perfectly round, but consist of a framework, which is usually divided into three or sometimes four sections. This framework is composed of light but tough wood, the sides covered with stout wire netting reinforced with bands of iron. The rim of each section is also covered with the same material, with the exception of a space which is left entirely open. The wheel revolves in the usual manner upon an axle, but in each section is placed a wooden trough. This trough is set at an angle, and projects about a foot or so from the side of the wheel, its lower end being directly over another trough which leads to the fish collector. This may be a box or merely a platform.

The wheel is suspended in a stout framework, each end of the axle being set in grooves, so that it can be moved up or down by the use of a block and tackle attached to the top of the framework. This is necessary in order to adjust the wheel to the height of the water, for at times the Columbia River rises from twenty to thirty feet, and if the wheel were immovable it would be too far under water to be of service. Consequently, the apparatus is raised or lowered to such a degree that about four feet of the wheel is continually submerged, the submerged portion acting like the paddle of a steamboat wheel. To resist the pressure of the water, which is very great, especially during flood time, the framework into which the wheel is set is built of heavy beams bolted together, and anchored to the shore not only by other beams, but frequently by steel cables, where the apparatus is not set into a fishway.

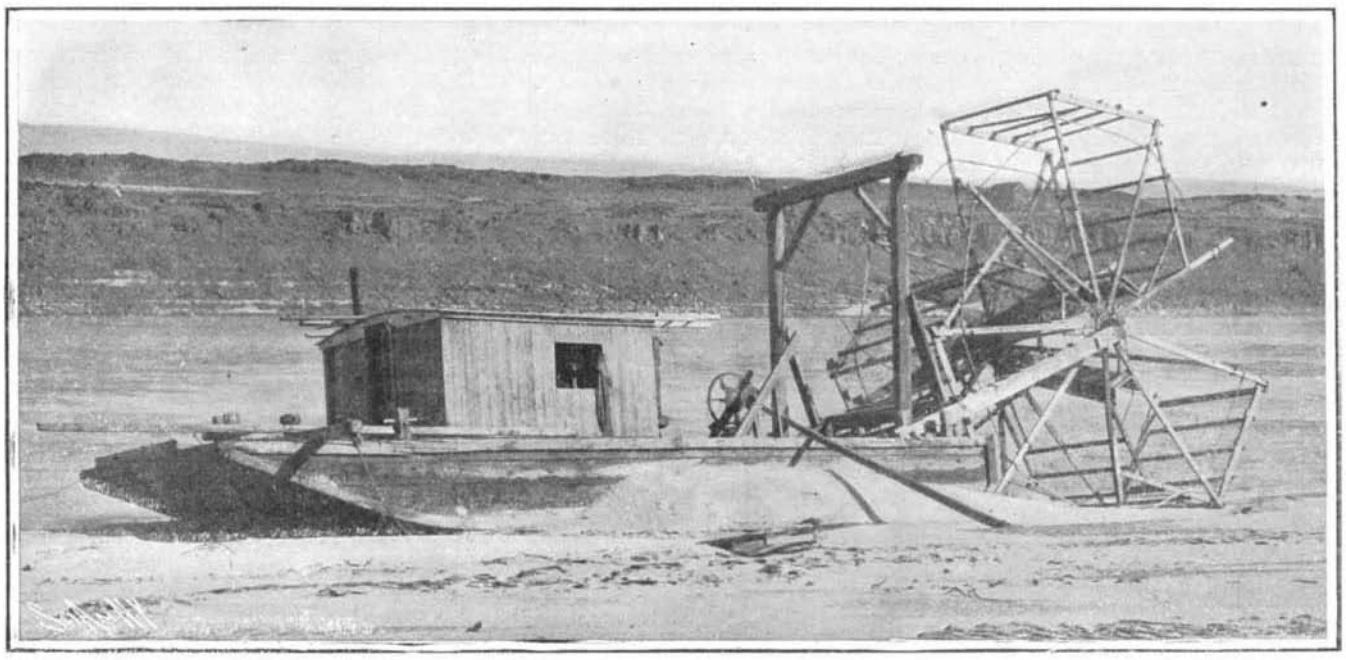
As the wheel revolves in the water, each of the compartments into which it is divided is successively submerged, the motion of course being downstream. The salmon in their ascent, going in the opposite direction, strike the rim of the wheel as it revolves, or pass into one of the compartments. If they hit against the netting and fall away from it, they drop into the opening, as each projects beyond the netted portion of the rim. As the wheel turns, the imprisoned fish are swung around with it, and drop into the trough in the bottom of the compartment. Through this they slide into the larger trough, and then also by gravity are deposited in the fish collector.

When the fish are thrown into the collector, they are taken out by hand and killed and cleaned on the platform or in the shed, which may be built near at hand. A few strokes of the knife remove the head and entrails, when they are ready to be packed and sent away or sold to a local buyer. The killing and clean-

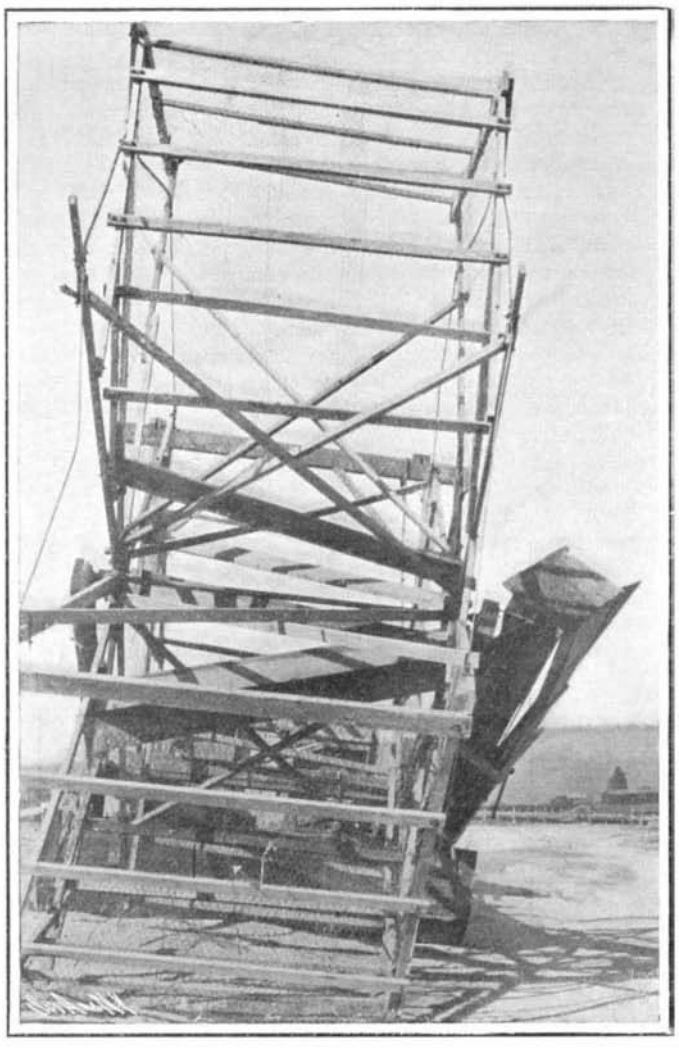
ing room is provided with a trapdoor, through which the refuse is dropped into the river.

The floating wheels are usually attached to the end of a scow, and while similar in shape and construction, are really considerably smaller than the shore wheels. They are attached to the scow by means of beams, which extend from a point beneath the axles to the deck. The beams move in sockets, and are held in position by wire ropes or cables, leading over a framework on the foredeck of the scow, winding on hand windlasses. By means of the cable system the wheel can be raised and lowered, and thus adjusted to the depth of water. The scow is anchored or moored to the shore, with the wheel end projecting downstream. Consequently, the wheel must be revolved by the current which flows underneath the craft, and the rim usually is placed about four feet lower than the bottom of the scow, in order to secure enough momentum. The scow is provided with a cabin, which forms the living quarters of the crew, sometimes a shed for cleaning, although this work is frequently done upon the dock itself.

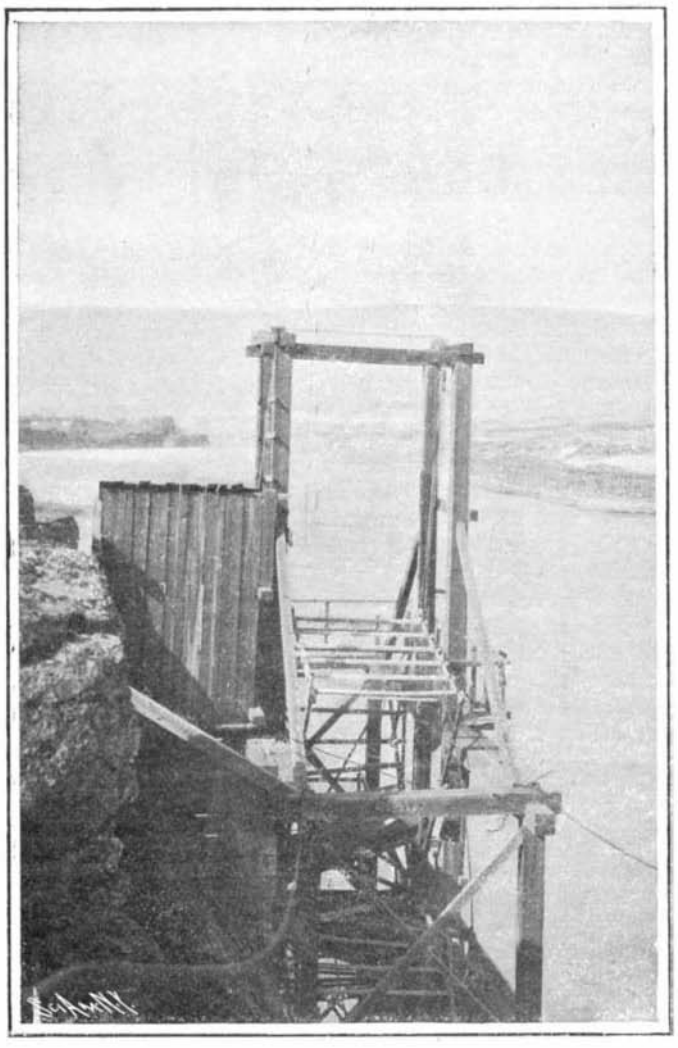
Such is the number of fish passing up the river during the "run" season, that from a single wheel fifty tons have sometimes been taken in twenty-four hours, as the fishing can be carried on at night by means of artificial illumination. It is a fact that some of the larger companies, maintaining a dozen or more wheels alongshore, have an electrical system by which each wheel is illuminated by arc lamps. On the Columbia the wheels are sometimes termed the "wheels of fortune," by reason of the profits which are derived by the individuals and companies owning them—some of the wheels earning from $500 to $1,000 in a day. Advantage is taken of localities where points jut out into the river, the wheel being set at the extremity of the point. Usually a leadway for the fish is built on the river side of the wheel, so that the course of the salmon which come upstream between the end of the leadway and the shore is diverted to the wheel. Where the shore line is but little curved, however, fishways are built supported by cribs of stonework, and the fish wheel set into the crib, as shown by the accompanying illustration. Until recently some of the leadways reached so far across the open river that the passage of the fish was almost prevented. This resulted in a law being passed, allowing the ways to be constructed only for certain distances and in certain directions. As it is, however, the run of the salmon has been decreasing from year to year, and is now of small proportions compared with the numbers which ascended the Columbia ten years ago. Fishermen say that this is true of nearly all of the streams frequented by the fish in Washington and Oregon.



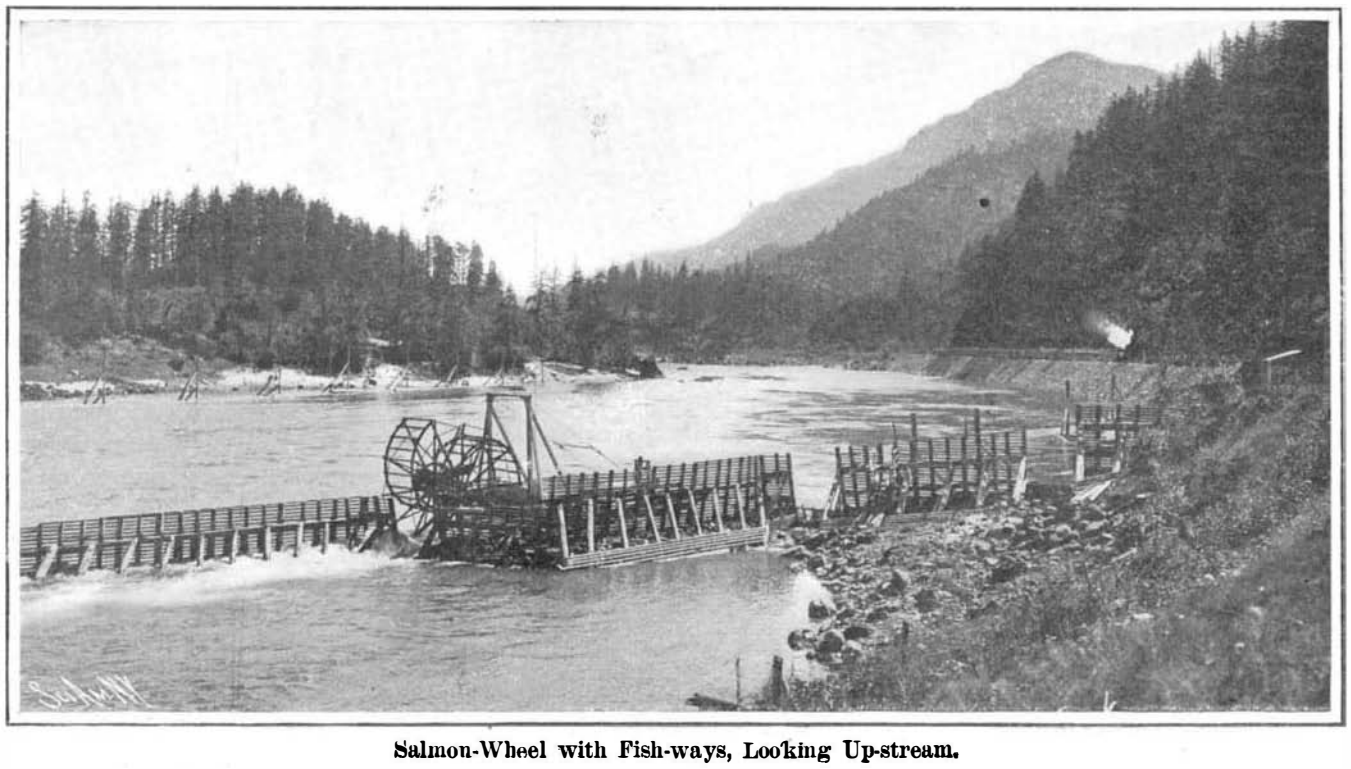
How the Floating Salmon-Wheel is Attached to the Barge.



End View of Salmon-Wheel, Showing the Nets.



The Rim of the Wheel is Open to Allow the Entrance of Fish.



Salmon-Wheel with Fish-ways, Looking Up-stream.

The argument that small quantities of deleterious substances as preservatives of food may be used without harm is not logical, nor can it be based upon the result of experiment. The use of boric acid and equivalent amounts of borax should be restricted to those cases where the necessity therefor is clearly manifest, and where it is demonstrable that other methods of food preservation are not applicable, and that without the use of such a preservative the deleterious effects produced by the foods themselves by reason of decomposition would be far greater than could possibly come from the use of the preservative. As a matter of public information, and for the protection of the young, sick, and the debilitated, each article of food should be plainly labeled and branded, so as to show the character and quantity of the preservative employed.

THE SALMON FISHERIES OF THE NORTHWEST.

The Utilization of Peat in Germany.

BY ARTHUR P. HALL.

The inventors of most known processes of briquetting peat have attempted to treat the raw peat by means of pressure. In only two processes is the peat coked. Doubtless the briquettes produced are much better than the ordinary dried peat, and possess a far greater calorific power and specific gravity. But the use of such briquettes has been confined largely to the places of their manufacture, because of the expense of transportation and of the impossibility of successfully competing with coal in localities where coal is readily obtained. Even in Germany, which may well be regarded as the home of the briquetting industry, such peat briquettes have been displaced by other forms of artificial fuel. Of the two processes for coking peat referred to, one has already failed because of the expense incurred in evaporating the moisture in the peat before coking. The only process which has at all succeeded is the Ziegler process, which it is my purpose to describe in this article.

The purpose of this process is to convert the peat, which contains 90 to 95 per cent of moisture, into a good, compact, smokeless fuel. All the products which are contained in the peat itself are recovered, and all the heat generated is utilized, thereby avoiding the necessity of using any other fuel. The process is, therefore, continuous and self-sustaining.

The peat is assembled in the usual manner by the ordinary peat machines which mold and press the peat into squares. The peat is then allowed to dry in the open air until it contains only about 50 or 60 per cent of moisture. The product thus obtained is placed in drying chambers which are heated by the burnt gases from the furnaces. The peat slowly passes through these chambers and emerges quite dry, but still containing 20 to 25 per cent of water. It is now ready to be coked. By means of endless belts the dried peat is conveyed to the top of the furnaces, into which it is conveyed at regular intervals.

The furnaces are vertical and are air-tight. The peat, therefore, passes through them without coming into contact with the outer air. The gas is generated by the distillation of the peat and used as fuel. The products of distillation, namely, tar, tar water, and gas, are drawn off from the furnaces at different elevations by means of exhausters. They are then condensed so that the tar is separated from the tar water and gas. After passing a water-sealed valve, the gas is allowed to enter the furnaces and is there burned. There is an excess of gas, and this is used either to heat the boilers or to drive gas engines, which, in turn, furnish the necessary power required in the process.

From tests made in a German factory it seems that one ton of peat (90 to 95 per cent moisture) produces 700 pounds of coke, 800 pounds of tar water, 80 pounds of tar, and 420 pounds of gas (6,650 cubic feet). From the 800 pounds of tar water there are obtained 8 pounds of ammonium sulphate, 12 pounds of acetic acid, and 12 pounds of wood alcohol.

The tar is used in Germany for the impregnation of wood. The coke constitutes a very valuable fuel in large iron and steel factories. The dust from the coke is bought by the Russian and German governments and manufactured into smokeless fuel briquettes by a secret process, which briquettes are used on war vessels. Something of the comparative calorific power of this fuel and of other fuels can be gathered from the following table:

Wood	5,760 B. T. U.
Ordinary peat	6,840 "
Pressed peat	7,290 "
Bituminous coal	11,000 "
Ordinary gas coke	12,060 "
Peat coke	12,676 "
Semi-bituminous coal	13,000 "
Charcoal	13,804 "
Anthracite	14,600 "

The comparative compositions of peat, coke, and charcoal are given by the following table:

	Coke.	Charcoal.
Carbon	84.23	85.18
Hydrogen	1.93	2.88
Oxygen	6.28	3.44
Water	4.47	6.04
Ashes	3.09	2.46
Sulphur		
Nitrogen		

Each furnace is so constructed that in twenty-four hours there are produced from 33,333 pounds of peat (20 to 25 per cent moisture) about 11,668 pounds of coke, 13,333 pounds of tar water, 1,333 pounds of tar, and 6,999 pounds of gas (110,833 cubic feet).

A new type of bullet, known as the "D," is being served to the French infantry. This projectile consists of a cigar-shaped cylinder of bronze, instead of lead, and is cased with nickel, as is the old Lebel bullet. On being fired it revolves at the rate of 3,600 turns a second during its flight. At 800 yards it will penetrate the equivalent bulk and resistance of six men standing one behind the other. The new cartridge is absolutely smokeless. All the Lebel rifles of the French infantry are being refitted for the "D" bullet with fresh sights up to 2,400 meters.

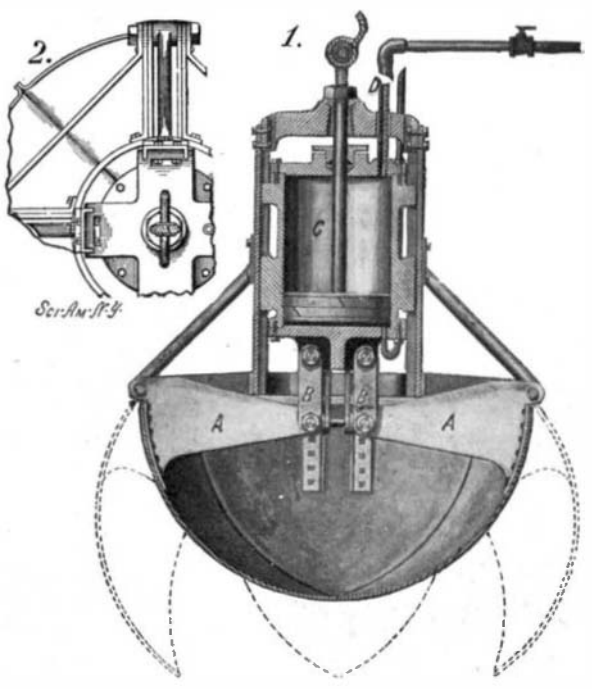
DEPTH GAGE FOR BRACE BITS.

The occasion often arises when it is desirable to drill a hole or a number of holes of a certain definite depth; but with the ordinary tools no means are provided for determining to what depth the drill or bit has penetrated. Mr. Edward J. Tiede, of 433 Johnson Street, Buffalo, N. Y., is the inventor of a simple attachment for bits, which will accurately gage the depth of the bore. This gage may be set to a certain mark and the hole drilled until the gage is reached, or the device may be used at any time to measure depth of the hole. The attachment consists of a simple clamp, which may be applied to the shank of the bit, and a gage bar adapted to be adjusted in this clamp. As shown in one of the engravings, the clamp is composed of two members hinged together at one edge, and adapted to be closed onto the shank of the bit. The members are held in this closed position by a spring latch, which snaps over a pin. By means of a thumbscrew threaded through one of the members and bearing against the shank, the clamp may be secured at any desired height on the bit. The gage bar passes through an opening in the other member of the clamp, and is fastened by a thumbscrew. This gage bar is graduated to inches, centimeters, or any other desired measure. The clamp should be so set that the zero mark of the scale comes in line with the upper face of the clamp, while the lower end of the bar reaches to the end of the bit. Then, if it is desired to drill a hole of say two inches depth in a block of wood, the gage bar would be raised until the two-inch mark came in line with the top of the clamp, and the brace would be operated until the end of the gage bar touched the surface of the wood. By keeping the gage at the proper adjustment, any number of holes of equal depth may be bored. The principal advantage of the attachment lies in the ease with which it may be applied to or removed from the bit shank.

DEPTH GAGE FOR BRACE BITS.

AN IMPROVED EXCAVATOR.

We illustrate in the accompanying engraving a recently invented excavator, which is of the sectional bucket type. The excavator has a very simple construction, and is provided with improved operating mechanism. It will be noted that no chains, or similar devices, are used for operating the bucket. Our illustration shows a section view of the excavator with the bucket in closed position, while the open position is indicated by dotted lines. The closed bucket has the form of a hemisphere comprising four segments. These segments. which have the form of spherical triangles, are pivoted at their outer edges to brackets extending from the frame of the excavator. Each segment carries a pair of arms *A* (shown also in the plan view, Fig. 2) and these are connected by means of links *B* to a cylinder *C*. The cylinder is formed with laterally-disposed lugs, which are received in channels or guides on the main frame of the device. This arrangement permits of vertical movement of the cylinder, to provide for the opening and closing of the bucket segments. Within the cylinder is a piston head carried on a piston rod, which extends through a crosshead at the top of the main frame. A nut on the piston rod rests on the crosshead, so that the piston head is suspended therefrom. The excavator is lifted by a cable attached to a bail on the crosshead. In use the excavator is lowered into the water, with the bucket open, as shown by dotted lines in Fig. 1. The segments naturally assume this position, as the cylinder slides by gravity down the tracks until it rests on the piston head. Then to close the bucket a valve is turned, admitting steam into the cylinder through the pipe *D*. The steam acting between the stationary piston and the upper cylinder head causes the cylinder to rise to the position shown in full lines in the engraving, and thereby closes the bucket. A small vent pipe at the lower end of the cylinder permits escape of the air below the piston. To open the bucket again, the valve is turned to permit escape of the steam from the cylinder, when the latter will drop to open position. A patent on this improved excavator has just been granted to Mr. W. H. Onion, 2518 Canal Street, New Orleans, La.



AN IMPROVED EXCAVATOR.

Official Meteorological Summary, New York, N. Y., November, 1905.

Atmospheric pressure: Mean, 30.04; highest, 30.59; lowest, 29.52. Temperature: Highest, 63; date, 29th; lowest, 19; date, 30th; mean of warmest day, 56; date, 29th; coldest day, 30; date, 14th; mean of maximum for the month, 51.1; mean of minimum, 36.6; absolute mean, 43.8; normal, 43.7; average daily excess compared with mean of 35 years, +0.1. Warmest mean temperature for November, 50, in 1902. Coldest mean, 37, in 1873. Absolute maximum and minimum for this month for 35 years, 74, and 7. Average daily deficiency since January 1, —0.1. Precipitation: 1.67; greatest in 24 hours, 1.42; date, 28th and 29th; average for this month for 35 years, 3.52; deficiency, —1.85; deficiency since January 1, —0.44. Greatest precipitation, 9.82, in 1889; least, 0.82, in 1890. Snow, trace. Wind: Prevailing direction, N. W.; total movement, 10.271; average hourly velocity, 14.3; maximum velocity, 48 miles per hour. Weather: Clear days, 11; partly cloudy, 13; cloudy, 6.

A New Process of Regenerating Rubber.

A European process for regenerating old rubber has for its principle the separation of the caoutchouc proper contained in vulcanized rubber from the mineral and other matter which have been incorporated into it, such as sulphur, etc. The first operation consists in dissolving the vulcanized rubber in one of the usual solvents, using petroleum preferably either alone or with benzine added to it. After treating for a certain time the insoluble matter is separated by filtering under pressure, or by a centrifugal machine. The solution when separated from the insoluble matter is evaporated to the consistence of syrup under a reduced pressure and is then taken up by acetone. The liquid which is thus obtained is first boiled and then decanted off and the rubber is again taken up by an alcoholic soda solution. After boiling and pouring off a second time, the rubber is treated with boiling alcohol. After the alcohol is taken off, the rubber is washed with water and then dried by superheated steam, which removes the last trace of alcohol and water it may contain.

The Current Supplement.

The current SUPPLEMENT, No. 1562, opens with what is perhaps the most exhaustive article which has thus far appeared on the electrification of the New York Central's terminal lines. The article is elaborately illustrated with views of power houses, stations, rolling stock, and track construction. Of interest to the amateur mechanic is an article on lathes. Mr. Ernest A. Dowson, whose name will ever be associated with the development of producer-gas, recently read a paper before the Birmingham Association of Mechanical Engineers on "The Use of Gas for Power and Heating." This paper may be considered an authoritative exposition of a most important subject. The first installment of the paper appears in the current SUPPLEMENT. Mr. R. von Lendenfeld discusses the relation of wing surface to weight, a subject of immense importance to aeronauts. The construction of a reinforced concrete power house is described. An interesting radial snow-plow has been invented, which is particularly effective on the curves of street railways. This snow-plow is described and illustrated. The usual formulæ and notes will be found in their accustomed places.