traversing this, make its exit through the insulated wire and the binding post, *P*. A single cell of dry battery is all that is needed, as it is only necessary to produce a sort of excitation in the bit of alloy at the start, and as soon as the motor is under way the current can be cut off. The electrical apparatus used is certainly of extreme simplicity.

As soon as the motor is well started, the point of ignition becomes somewhat advanced, for the incandescence of the bit of alloy increases gradually till its maximum is reached. It then has a temperature of 1700 deg. C. (3092 deg. F.), a temperature superior by 750 deg. C. (1382 deg. F.) to that obtained by the best burners.

It is noteworthy that this temperature is lower than that of the electric spark, which is generally conceded to be in the neighborhood of 3000 deg. C. (5432 deg. F.). But, in a unit of time, the number of calories disengaged by the osmium (and this is the important point in the discussion) is much greater than the number disengaged by a spark. A piece of wool saturated with gasoline, and approached in a closed jar toward the osmium and toward the spark, takes fire three centimeters away from the former and only ignites when within one-half a centimeter of the latter.

The inflaming alloy, therefore, forms in the Wydts plug an incandescent center comparable to that which the burner forms in a platinum tube. But the great difference consists in this, that in the system just described, this incandescent center, *C*, can be moved while, when produced by a burner, it is fixed. The result is that while in order to produce advance ignition in a motor with burners, it is necessary to use a platinum tube longer than the one ordinarily employed, and thus render necessary in this tube a lower compression, that is to say, a compression more quickly obtained by the piston, inversely it is necessary with the Wydts igniter to shorten the length of the chamber by advancing the incandescent point toward the cylinder.

The useful ignition advance for a given motor can be calculated by the constructor, who can set the piston in the plug and fasten it by the screw, *V*; or it may be obtained by hand by moving the piston when the motor is in operation. The sudden stopping of ignition can be accomplished by withdrawing the incandescent mass past the hole, *E*. The introduction of the oxygen of the atmosphere affects the incandescent piece of alloy, in that it suddenly lowers the temperature to a point sufficiently to interrupt ignition, while at the same time it spoils the explosive mixture in the cylinder. The motor consequently stops at once. To start it again, all that is necessary is to push in the piston sufficiently to close the hole, *E*, connect the battery in circuit, and give a turn of the crank. Twenty seconds after, the current is cut out, and the motor runs as before. If the motor had been stopped in some other manner, and the igniter piston left as far in as possible, the operator need have no fear of its kicking back when he attempts to start it, for the incandescence of the osmium would then be at its minimum, and the explosion would occur at a point sufficiently behind that where it occurs when the alloy has reached its maximum incandescence to make a back kick impossible.

Finally, after having taken the Wydts plug out of the motor and smeared it with oil and soot by means of a brush, I saw the motor start at the first turn after the plug had been re-inserted. Five minutes later, upon taking out the plug again, I found the osmium alloy bright and showing no trace of the foreign substances.

Prevention of Malaria.

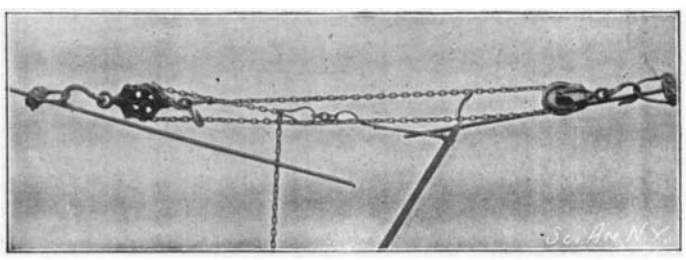
Major Ronald Ross has practically succeeded in ridding Freetown, the capital of Sierra Leone, from malarial epidemics. Malaria, yellow fever, and elephantiasis have all been sufficiently shown to be carried by tropical gnats. These are the principal and possibly the sole means of infection; and although that has yet to be demonstrated, his "object lesson" will probably settle the doubt. The gnats in question are Anopheles, Stegomyia, and Culex, the first of which breeds in puddles, the second and third in rubbish heaps. Dr. Logan Taylor, the head of his Freetown staff, was therefore instructed to hire a body of scavengers who would drain or fill up pools and puddles in the streets, and to clear the back yards of broken bottles and buckets, empty tins, old calabashes, and so forth. The Culex gang, under a native headman, removed the rubbish into carts and subsequently discharged it into an assigned rubbish shoot. At the same time, they showed the larvae to occupants of houses, and instructed them in the manner of destroying them by emptying the vessels, or by dropping a little oil on the surface of water in which they live. By this means about fifty houses were cleaned. In less than three months the gang had visited 6,500 houses in a town of 40,000 inhabitants, and disposed of more than 1,000 cart loads of rubbish. The effect can be imagined when it is remembered that about one-third of the tins and bottles contained larvae during the rainy season, at which time they were destroyed. Every house had been breeding mosquitoes in its own backyard, or garden. The Anopheles gang had a more difficult task. The streets, yards, and gardens possessed numerous pools of rain water. Some were filled with earth, rubble and turf. Others were evacuated by cutting through the rock which contained them, or by making channels in the soft earth. Several men were specially employed in brushing out with brooms, or treating with crude petroleum or creosote, those puddles which the rest had not had time to touch.

A LEVER-DEVICE FOR OIL-RODS.

In oil fields, a central power is often connected by pump-rods with the several pumps located at a distance. Sometimes a pump-rod breaks and the several portions move apart. An extremely useful device for enabling a single operator to draw the parted ends together has been invented by Mr. Asahel C. Smyth, of Bolivar, N. Y.

Mr. Smyth reeves a hauling-chain through two pulleys attached respectively to the severed parts of the pump-rods. A pivoted grappling-hook and a grabring connect the free end of the chain with a link pivoted on a lever having a grappling-hook embracing the main run of the chain. By locking the lever grappling-hook and chain together and swinging the lever in one direction, it follows that the attached pump-rod is drawn along. When the lever has reached the end of its stroke, its grappling-hook is disengaged from the chain, and the chain will be locked by its grappling-hook. By swinging the lever now in the opposite direction a new fulcrum is obtained for a repetition of the operation. In this manner the free end of the chain is gradually moved along with the chain passing around the pulleys, thus drawing the sheave and rod along half the distance the free end of the chain has been moved.

By means of a short branch-chain for engagement with the link, a pair of connected hooks for securing the runs of the chain in front of the one sheave, and an S-hook for taking up the slack of the chain, it is possible to continue the successive pulls on the rod, when the lever device reaches the fastened end of the chain and the two parts to be drawn together are still separated.



SMYTH'S LEVER DEVICE.

THE YEAR OF 1901 IN THE KLONDIKE.

BY JAMES HAROLD THOMPSON.

It is the history of a "Placer Mining Camp" that its life is short and eventful, while it lasts, and that it springs rocket-like into prominence and sinks gradually after having reached its years of plenty into a thing of the past.

The Klondike has reached the crucial year of its existence. "For hope's sake" many have continued their confidence in the future of Dawson; the hub of what has been the richest placer mining camp of this and possibly any other decade. The hope of those interested in commercial enterprises along the Canadian Yukon is the discovery of quartz in paying quantities.

As to the future of the mining district which in 1897 so startled the world and which since then has been such an abundant gold producer, known as the Klondike mining district of the Northwest Territory of Canada, its future depends upon the discovery of well placed quartz. It is acknowledged by the conservative knowing ones that the days of big profits in mining and commercial enterprises are past and are only present now in reminiscence. Overland and water navigation from the coast, with its difficulties, are now subject to modern systems of railroad and steamboat transportation, and when the Arctic winter has put its seal upon this northern country, the telegraph daily voices the events of the world in Dawson.

Heretofore merchants and tradesmen reaped big harvests, 100 per cent being not an uncommon profit. Yet it was seldom that capital profited its owner more than once a year because of navigation and railroad facilities. The short season beginning in June and ending in October, coupled with the lack of telegraphic communication, allowed time for but one shipment during the year. As a consequence the necessities of life were ofttimes cornered and prices in some instances reached prodigious heights. As competition became a factor many of the larger commercial enterprises drew together and amalgamated their interests. Two companies now control the market. In every department of mercantilism competition is keen, excepting in one which is a very essential one here. That one is the oil trade. The Standard Oil Company has complete control, and it retails a case of kerosene at $12.50 per case. The same case of oil sells for from $2 to $3 in the States. Merchandise is delivered in Dawson for from $70 to $90 per ton, just about half of what it was in 1899. And yet this price is deemed abnormal by the importers and a strenuous effort is being made to have it reduced to $50 per ton. The cost of mining has been cheapened by the use of steam and machinery, enlarging the yearly output of gold much over what it would have been under the crude methods of the "sour dough."

Government regulations have somewhat hampered the prospector, but withal he has been quite vigilant and has as yet discovered nothing since 1898 to perpetuate the reputation the Klondike has had as a gold producer. Claims upon the banner creeks whose reputations as gold mines have equaled the wildest hopes of the pioneer prospector are gradually being deserted and to-day half, I might say two-thirds, of Eldorado Creek has been worked out. The same is true of the other rich spots of a few years past. The life of the camp, from what is in sight, can be estimated at this date.

Prospecting for quartz is occupying the attention of many hard-rock miners along the Yukon and its tributaries. Upon the successful solution of the quartz question depends the present prominence of Dawson as a mining camp, and it is the one thing talked of and hoped for by the present inhabitants of this district. As yet nothing of any permanent value has been discovered, although many of the numberless claims staked and recorded are being worked quite thoroughly. Companies have been formed and their stock is on the market. Their hope is that the present prospects will lead to the substantial vein, or the "Mother Lode," as it is called. To facilitate the sorting, handling and assaying of these prospects two fine stamp mills have been erected in Dawson and are now crushing quartz rock.

Prior to the discovery of the Klondike district it was found practical to thaw the frozen earth to almost any depth by the use of wood fires. Hence as the gold lies in or above the bed rock ground, when the bed rock was one hundred feet below the surface it could be worked as well as that of twenty-five feet. The winter season being the longest and driest season it became the busy season for the miner. But steam and machinery have reversed this order of things, and as in the days of the oldest "sour dough" miner, summer, although the season is but six months long, has become the time of activity. The majority of heavy operators discontinue altogether the operation of their properties and spend the winter months at their ancestral homes, wherever they may be. As a consequence, the work accomplished this winter will not compare at all favorably with that done during the preceding winters. It also means a busy summer season for 1902. Considering those changes, the consensus of opinion of those conversant with this district is that the output of gold will decrease from this year.

Gold mining will continue here for some time. This is the history of similar camps. Capital will gradually withdraw, and individuals who will be content with wages for their labor will work the old workings. These are known as "snipers" in the vernacular of the miner.

The development of the unknown resources of the vast land known as Alaska and the Northwest Territory should be of constant interest to the farmer, merchant and manufacturer of the United States and Canada. Directly and indirectly it is of vital importance to these mother countries. The actual necessities of the man living next door, too, and within the Arctic circle will support a larger portion of labor than the similar necessities of any individual living in any other portion of the globe. Good pure food; plenty of it; abundance of well-made clothing are absolute necessities for the health and preservation of life in this cold climate. If peopled as it should be, were the resources of this vast territory but opened up in a limited degree, the commercial world of the North American continent would have a market open to their products which would be the surest in times of depression, the most profitable and congenial for the absorption of the congested material.

Experiments have proved that the hardier cereals and vegetables can be successfully raised within the Arctic circle, but the season is so short that competition in this line will not become a factor for many years. The advent in the manufacuring line, factories, etc., is not to be considered. Beef has thus far come from the Western States and British Columbia, and the winters are found too severe for stock raising.

Legislation can greatly facilitate the work of those who are destined to develop and pioneer the many industries which will some day flourish here.

American granite is being shipped to Liverpool.