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PETROLEUM FOR FUEL—ITS ECONOMY CONSIDERED.

In last week's issue we determined the amount and the cost of the heat generated by the combustion of petroleum. The following is a resumé of our conclusions: Petroleum, weight for weight, has 50 per cent. more heating power than coal, a fact expressed by the ratio 21 to 14, or 3 to 2. If oil costs 21 cents per gallon and coal \$6 per tun, then the oil heat costs six times more than the coal heat. Oil, equivalent in price to coal at \$6 per tun, would cost 3½ cents per gallon; and coal, equivalent to oil at 21 cents per gallon, would cost \$36 per tun.

It should be observed that the figures used in the discussion are as favorable to petroleum as could be chosen; to avoid the inconvenience of fractions, we have selected the nearest simple expressions which would make the best case for petroleum. Thus we have reckoned the gallon of oil at 7 pounds, the coal of \$6 per tun as ½ cent per pound, and we have assumed that actual practice in burning oil and coal was fairly conformable to the ratio 3 to 2. As to the practical experiments, we regret that we are obliged to say, that on the question of the economy of burning, they appear quite unsatisfactory. No authentic account of the economical results attained in the experiments with Colonel Foote's apparatus at the Charlestown Navy Yard, or on board the gunboat *Patrol*, has come to our notice. Is it not a little remarkable that, in the voluminous publications in newspapers and elsewhere, the one most vital point was ignored? In the experiments with the same kind of apparatus at the Battery in this city, the whole force of the steam evaporated seems to be used in blowing the fire under the boiler. In the experiments at the Brooklyn Navy Yard, which have been very skilfully conducted under the supervision of Lieutenant Clark Fisher, 12 to 13 pounds water were evaporated by one pound of oil; but against this (in a discussion of economy) must be placed the steam raised by an independent boiler, which was used in urging the fire. Mr. Richardson, in some of his experiments at Woolwich, England, needed one-fifth of the whole steam evaporated to secure perfect combustion! So it appears that, in practice thus far, oil, weight for weight, has really done but little better than coal. We are of the opinion, however, that the ratio 3 to 2, by improvements of the burning apparatus, may be attained, but better than that nothing is to be hoped for, and perhaps nothing is possible.

As the matter now stands, the use of oil for steam fuel seems almost chimerical; the discussion of such a question here seems a waste of good ink and paper. But petroleum fuel for ocean navigation has been so much praised, that, deprecating the patience of our intelligent readers, we devote a few lines to its showing up. We use the simple figures which we have adopted above. A first-class ocean steamship puts on board 1,500 tons of coal, of which she uses about 150 tons per day. At \$6 per tun, the cargo costs \$9,000. An equivalent of oil, at 21 cents per gallon, would cost \$54,000. The difference between the cost of coal and oil is \$45,000; these are surely great figures for oil. But it is claimed that the use of oil will save the wages of firemen and coal passers, and a great amount of stowage. How much stowage room, if any, is to be saved after the oil is so tanked that it will be safe, does not clearly appear; but, for the argument, allow one-fourth. The accounts of oil and coal respectively stand about thus:

Cost of oil.....	\$54,000	Cost of coal.....	\$9,000
Deduct 375 tons extra freight, \$5 per tun.....	1,875	Add 10 days wages of 80 men, \$3 per day.....	2,400
Cost of oil trip.....	\$52,125		
Cost of coal trip.....	11,400		\$11,400
Loss by oil.....	\$40,725		

It is said that petroleum can be had in California at \$3 per

barrel (7½ cents per gallon), while coal is dearer than here. Interpolating this cost of oil in the above statement, the loss by using the oil would be a loss of only a little over \$7,000 per trip. Unfortunately for this most hopeful estimate, no petroleum has yet been found in California. In California, Mexico, and on the West India Islands, there is abundance of a bituminous tar, erroneously called petroleum, which some time may be useful for fuel, but which is wholly unadapted to most of the devices for burning petroleum. The question, whether six or seven thousand barrels of crude Pennsylvania petroleum may be put on board a first-class steamship with less impunity than gunpowder and nitro-glycerin, need not come into the discussion.

WHAT IS LABOR?

To its present inhabitants, at least, this is a new country. The wildness and luxuriance of nature must be tamed and pruned to fit it for the highest needs of the race. One result is that as a people we are practical; we praise labor; we admire muscle; we reward it with political honors; our preachers preach "muscular Christianity;" our young men—nay our old men—contest for the meed of victory in base ball; the race is to the swift and the battle to the strong; gymnasia and calisthenic schools are a part of our educational institutions, and brain work is at a discount, or rather, muscle rules.

So long as this pride of bodily strength and physical energy, is kept in its proper place, all is well, but are we not encouraging a sentiment which is unjust to the brain workers of the race? Is it true that the crowning glory of a man is his physique? Are the laborers, the muscle men, the only ones who labor? Do not others who stand in the pulpit or on the rostrum, who study in libraries, experiment in laboratories, think, investigate, and write in parlor and sanctum, actually labor? Is the projector and director less a worker than he who delves and digs? We think not. All honor to the well directed muscle which expends itself in transforming the wilderness, in improving our homes, and in constructing machinery and other appliances for human comfort and happiness; but at the same time, justice to the thinker, the writer, and speaker, who elaborates the crude idea and transforms from the shapeless ore of thought the coin of the mind.

The inventor knows how often his nights are passed in sleeplessness, and his days in abstractedness, in order to elucidate and perfect his unformed ideal. The editor knows how hand and brain become exhausted in the effort to lead, or even to keep up with the never ceasing march of improvement. The mind and body are too intimately connected for the exercise of one not to weary the other. The thinker feels a languor of the body as well as an exhaustion of the mind after protracted intellectual work. The writer calls into play a set of muscles which are among the most easily tired. The almost unceasing movement of the hand and arm in the act of writing is scarcely surpassed in any merely manual labor. Back and forth across the page and from inkstand to paper, for hours, the hand must go, until the wearied muscles refuse to perform their office. The constrained position is next in exhaustive tendency to an enforced confinement in the stocks. Often the body becomes so debilitated that when the writer is released his appetite is gone, and a languor which forbids healthy sleep succeeds.

But apart from the bodily weariness induced by the bodily exertion, the overstrained brain reacts on the body and produces a sense of physical strain not at all different from that experienced by the muscle worker. The enforced action of the will, which compels concentration of thought on one subject, produces intense weariness and pain of body. Then the frequent diversion of the attention from one subject to another, compulsory on the businessman, who overlooks the different departments of his business, and the requirements of many persons, who intrude upon him every moment during the day, is anything but conducive to ease of body.

Except for those who perform the simplest and most mechanical labor, there must be brain work with muscular exertion. The unthinking worker only half works. His is the labor of the slave or the ox, with no incentive but the hour of release and the gratification of appetite. The mechanic is thoughtful of the process which the machine he tends is elaborating. He observes its failures and shortcomings and straightway sets the brain at work to improve the device. Or he finds employment for mind in devising an improved tool. Hence come some of our most valued inventions. Is this brain thought no labor? Does it not weary? It would be ridiculous to argue otherwise.

To return to the mental laborers, who among the people age faster? Their hair grows gray and their bodily functions refuse their office sooner than those of the merely mechanical laborer. Theirs is the harder lot, for the mind driven for hours in one track, refuses to stop at beck or call, and it becomes master of the enervated body and denies it rest; while the mere muscle worker finds repose as soon as the strain on the muscles is relaxed.

He is the hardest laborer who drives the brain only, and he is the most reasonable worker who judiciously divides the responsibilities and duties of life between brain and muscle.

RECENT PROMOTIONS AT THE PATENT OFFICE.

For many months the Commissioner of Patents has been promising, promising, to use the authority vested in him by law, to augment the working force of the Patent office, and thus relieve applicants for patents from the grievous delays to which they have so long been subjected. We are happy to record the fact that the Commissioner has at last taken one little step in the right direction, and now, if he will only go ahead in the same line, it may yet be possible for an in-

ventor to obtain a patent before he grows gray.

The following is the list of promotions:—Assistant examiners Schœpf, Thatcher, Stewart, Deane, Peters and Gregory, have been promoted to be Primary Examiners.

Second assistant examiners Thayer, Coombs, Nolen, Hayes, Mygott, Tasker, Curle, Bovee, Spear, Mitchell, and Grinnell, have been appointed first assistant examiners.

Nearly all of these gentlemen have had experience in the duties of the offices to which they are now promoted, and their appointment in preference to new men will undoubtedly be of great advantage to the Patent office.

But their promotions have added nothing to the working forces, though they may perhaps pave the way for such addition. Now, Mr. Commissioner, fill up the ranks with active men, bring up the work at once, and don't wait to be urged and complained about from one end of the country to the other.

NITRO-GLYCERIN—IMPORTANT DECISION.

None of us can ever forget those fearful explosions of nitro-glycerin which took place about three years since. They were heralded by the disaster of the Wyoming Hotel in this city. A small box which had been left in the baggage-room was discovered to be on fire, and was lifted into the street at the edge of the sidewalk, when immediately it exploded with such force that it shook the ground for many blocks; the sound was heard in the most distant parts of the city, the buildings in range were greatly injured, and no vestige of the box and its contents was afterwards discovered. This was at 11 o'clock of a Sunday, the most quiet hour of a quiet day; and only one life was lost, but about a score were wounded. This seemed sufficiently fearful to those who were in the neighborhood. It needed the succeeding events to startle the whole world.

On the 3d of April, 1865, nitro-glycerin exploded in the hold of the *European* while at her dock at Aspinwall. The *European* was a powerful iron steamer, and had cost nearly \$200,000. She was literally torn in pieces. A dock four hundred feet in length was destroyed, and great damage was done to the shipping and buildings of the neighborhood. In this case, as at the hotel disaster, Providence seems to have interposed for the saving of life. The number of killed was only sixty.

Then came in quick succession the details of still more fearful nitro-glycerin explosions in other quarters of the globe—from San Francisco and Sidney. In a few months we had paid tribute to this demon, hundreds of lives and millions of property. Then vengeance and punishment were ready for the guilty abettors of the destruction, if they could be found. But the efforts of justice were slow, and it may be that many years more will elapse before the law can give the demanded relief.

One of the most important cases now pending in the courts is growing out of the Panama explosion. As the event of this suit will determine others of similar character we give the latest information about it, which came by the Atlantic Telegraph.

THE NITRO-GLYCERIN EXPLOSION AT ASPINWALL—IMPORTANT LEGAL DECISION.

LIVERPOOL, Wednesday, Aug. 21.

The important suit of the West India and Pacific Steamship Company vs. WILLIAMS & GUION, just tried in the Liverpool Court of Assizes, has resulted in a judgement for the plaintiffs, with damages assessed at £130,000 sterling.

The suit grew out of the nitro-glycerin explosion at Aspinwall, New Granada on the third of April, 1866, by which the steamship *European*, belonging to the plaintiffs, was badly damaged while lying at her wharf in the above-named port.

The explosion also resulted in the loss of sixty lives, including those of the Captain and other officers of the steamer. The steamship *Caribbean*, of the same line, being in port at the time also sustained serious damages.

The ship was valued at from £36,000 to £40,000. Her cargo was insured for about £80,000. The damage to the *Caribbean* was estimated at nearly £10,000.

The owners of several buildings on shore, which were demolished, put in their claims for damages to a considerable amount additional.

The underwriters declined to make good the losses, and threw the responsibility upon the owners of the *European*, upon the ground that they were culpable in carrying explosive matter on their ship, and below deck.

The plaintiffs in turn brought suit against Williams & Guion, as the shippers of the nitro-glycerin, claiming that they were guilty of deception in shipping the article under the name of "glonoin oil," (a substance unknown to chemists and to commerce,) and thus involved the plaintiffs in their great losses and liabilities.

The defendants replied that they acted in the matter only as "forwarders;" that the explosive material came to them from a Hamburg house, with instructions to forward to BANDMAN, NEILSON, & Co., San Francisco, via. plaintiff's line; that they themselves were deceived by the descriptive title of glonoin oil in the manifest, and had no knowledge or suspicion of the dangerous character of the freight which thus passed through their hands in the usual course of their business.

The judgement rendered is understood to definitely settle the fact that the plaintiffs are entitled to damages, and that they cannot recover their losses from the underwriters; but the question whether the defendants are ultimately liable, or whether the plaintiffs must look to the original shippers at Hamburg, the originators of the fraud, goes to a higher tribunal for argument and decision.

Large Issue of Patents.

The patents issued for the week ending Aug. 20, numbers, exclusive of designs and reissues, one hundred and ninety. Of these, seventy-five were secured through the home office of the SCIENTIFIC AMERICAN Patent Agency, exclusive of quite a number obtained through our Washington office. Who can say that genius is dormant, if business is generally dull?