Correspondence.

The Balanced Cable Crane.

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of January 27 there appears an article on a "New Overhead Traveling Gear for Expeditious Construction in Shipyards," which was written by your English correspondent, and in which it is stated that the credit of having devised the system belongs to Mr. John Henderson. You will find in your issue of August 10, 1895, what we believe to be the first published account of this system. So far from its being an English invention, we beg to assure you that the "Balanced Cable Crane," as it is called in this country, is the invention of an American engineer, W. F. Brothers, of Brooklyn, and that he has protected himself in the United States and Europe by numerous patents, the first of which was taken out in 1895.

BALANCED CABLE CRANE COMPANY.

Brooklyn, N. Y., February 7, 1906.

Bewildering Conceptions.

To the Editor of the SCIENTIFIC AMERICAN:

The writer enjoyed Prof. Larkin's splendid article, "New Conceptions in Astronomy," published in your issue of February 3, 1906.

The unthinkableness of this vast myriad of suns, alive and dead, in constant motion, in this awful limitless space around us, is enough to drive man to insanity, or back to the sullen beast, from which he sprung, were it not for knowledge of the Purpose that leads him on.

But there are wonders and problems in us, and around us, as great as the mysterious suns and equally beyond our mental conception. The life in insect or man, the conception of life, thought itself, the constant pumping of the blood, chlorophyl in the leaf, the odor of the flower, memory, electricity, the life in a lump of coal or radium, crystallization—all would snap the mind, if probed too far and too intense.

The only relief is knowing that there is a Purpose through it all, and that the good or evil impulses of life are of man's choice. If good, he lives and becomes a part of the great vibration; if evil, his spiritual life is lost. This Purpose has raised man from a fierce animal, probably originated in the jungle of the Malay Peninsula, and has led him by the hand through forest, field, and over seas, from densest ignorance and superstition, through many backfalls and retrogressions, to what he is in this the twentieth century. Every step of the way has had to be battled for, and no problem, however black it appeared, but has had the light beyond. All will be won through man's endeavor. If it were not for this slow but ever-forward guidance to the Ideal, life would seem hopeless, and all endeavor vain.

W. GOODRICH JONES.

Temple, Texas, February 6, 1906.

Cooling Gas-Engine Cylinders.

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of January 20 the article by Mr. S. M. Howell on the cooling of gas-engine cylinders contains statements which, while to a certain extent theoretically correct, are so very much opposed to practice, that attention should be called to the same.

In the first paragraph of Mr. Howell's article it is stated that an air-cooled cylinder will develop more power than that secured from a water-jacketed cylinder of the same size. While in theory this might be possible, in practice it is absolutely incorrect. The excessive heating of the cylinder, apart from any other drawbacks, heats the incoming charge to such an extent as to prohibit the necessary amount entering the cylinder to enable the engine to develop its rated horsepower. Disregarding jacket losses, a cold gas-engine cylinder will develop very much more horse-power than a hot one, owing to the fact that it will take up a very much larger volume of gas per stroke. In practice the jacket losses where the cooling water is kept at a temperature of 180 deg. F. are found to be as small as it is possible to make them under any conditions.

The most important means of reducing power losses through jacket radiation have been the changing of the design of engine construction, so that the valve chamber usually employed is obviated, and the valves open directly into the head of the cylinder; by this method as much as 50 per cent of radiating surface is eliminated without any attendant disadvantages.

Referring again to Mr. Howell's article as to complete combustion of the fuel gas in an engine cylinder, this altogether depends upon the time of ignition. For example, if the cylinders were quite cold, complete combustion could be obtained at the right period of the stroke by having the ignition start early enough. This the writer has proven in practice by exhaust gas analysis.

Referring to the method suggested of having the active part of the cylinder lined with a refractory non-conducting material which would be maintained at a dull red heat, the writer begs to state that in such an arrangement it would not be necessary to have any compression at all so far as ignition goes, as the temperature of the walls would attend to that matter immediately upon the combustible charge entering the cylinder.

Referring to the suggestion of compounding a gas engine, this is a matter which is under wide discussion in the gas-engine field, but about which the consensus of opinion seems to be that compounding is more detrimental than otherwise, owing to the back pressure supplied to the high-pressure cylinders interfering with their free exhaust. Also the figure stated of 100 pounds pressure per square inch of exhaust gas is incorrect, as the average exhaust pressure will be found to be only 20 pounds per square inch. So that the actual losses from this source are not as high as figured in the article referred to.

Compounding a gas engine is a very different proposition from compounding a steam engine, for the reason that we have no condensing effect from the gas engine exhaust to help us out in our economies, as we have in the steam proposition.

To sum up, the writer feels that the engine construction as outlined by Mr. S. M. Howell, however practical from a theoretical point of view, would prove a very undesirable engine in practice, even if the inherent disadvantages of this construction were overcome sufficiently to admit of its operation.

GODFREY M. S. TAIT.

New York, January 20, 1906.

An Anticipation of the Gas Engine with Refractory Lining.

To the Editor of the SCIENTIFIC AMERICAN:

In an article by Mr. S. M. Howell appearing in the January 20 issue of the SCIENTIFIC AMERICAN, a sketch and outline of operation of an alleged new type of internal-combustion engine are given.

An engine of this type, designed by the writer, was exhibited at the Canadian National Exhibition, September, 1905, and attracted a great deal of attention there. In this engine are embodied all the points of advantage enumerated by Mr. Howell, such as a heat-insulated combustion chamber, a piston extension with heat-insulated cap, which prevents the hot products of combustion from coming into contact with the cold cylinder walls, injection of fuel at the beginning of the power stroke, etc. This engine is single-cylinder, horizontal, 8-inch diameter by 8-inch stroke, 300 to 350 R. P. M. Compression constant at 150 pounds per square inch (charge of air always full cylinder volume). Governed by varying individual charges of oil to suit load.

At this exhibition the engine was running under about half load, driving a centrifugal pump, pumping water over an artificial waterfall. The engine ran about eleven and one-half hours each day, no stops. Oil consumption about one-tenth gallon per horse-power hour; crude fuel oil, six cents per gallon, barrel lots, f. o. b. Toronto.

This engine represents the results of about two years' hard and steady experimental work. Now that the ground has been gone over, everything appears quite simple, but to work out a practical construction from the given theoretical considerations is a much greater task than one who has not tried it would imagine. The writer has experimented with over fifty different substances for the interior lining of the cylinder, scores of fuel-injecting devices, to say nothing of the hundred and one little devices that require a painstaking course of study and trial before their defects are eliminated. These latter comprise oil force pumps and charge-measuring devices, starters, preliminary heaters, modes of fuel injection, arrangement of valves and valve gear, air pumps, governors, etc.

For two months after the first engine was constructed it did not develop enough power to keep itself in motion, the M. E. P. then being only about ten pounds. From this it was gradually raised step by step, the highest M. E. P. yet recorded being one hundred and three pounds per square inch.

The engine will now run on any liquid fuel, has never needed cleaning out, and has no electric nor hot-tube igniter.

An illustrated description of this engine appeared in Canadian Machinery for September, 1905, and in other Canadian trade papers.

H. ADDISON JOHNSTON.

Toronto, Canada, January 25, 1906.

Reducing the Skin Friction of Vessels.

To the Editor of the SCIENTIFIC AMERICAN:

I note the article by a correspondent, published in your issue of January 6, about the suggestion of using air bubbles for lubricating the immersed bottom of ships for their easier propulsion in water. The idea is a good one, as it is an established fact that the power needed by a vessel increases tremendously as the speed gets greater; i. e., if 1,000 horse-power are required for 12 knots an hour, for a certain ship, maybe 12,000 or 15,000 horse-power or more will be needed for 24 knots an hour for the same vessel.

For my part, I believe that the lubricating with oil or some greasy substance, is the best scheme for diminishing the water friction. But how could such a lubricant be made and used permanently on all the bottom of the ship? That's the question. I have made many a time the following experiment: I take a flat piece of soap, pretty nearly all used, between the thumb and forefinger and press it in a basin of water, shooting it through the liquid, just as a child would shoot a cherry stone through the air. The piece of soap travels easily through the water, as if it did not meet any resistance at all, while any other similar shaped object, handled in the same way, would hardly move an inch before stopping entirely. Also, if while bathing, one rub his whole body with soap, and let it dry a few minutes, he can notice, when he starts to swim, with what ease he can propel himself. The skin of fish secretes more or less a certain greasy substance which greatly facilitates their motion through water. In fact, all aquatic specimens have their bodies covered with a glutinous substance. Why not apply the same principle to ships? First, experiment with fast launches provided with high-powered engines, next with swift sail-boats, and they will be surprised with the increase of speed attained.

ALBERT VIVIAN.

Santa Anita, Cal., January 11, 1906.

A Correspondent Not in Favor of Saving Niagara.

To the Editor of the SCIENTIFIC AMERICAN:

I have become interested in the questions that are being offered and published in your paper of how to save Niagara Falls.

As a disinterested engineer, and a reader of the SCIENTIFIC AMERICAN for fifty years, I will say that I don't want to see them saved merely for optical or sentimental purposes, for practical utility should always, from a humanitarian standpoint, displace sentiment.

It is a fact that the present useless, enormous waste now passing down the Niagara River, can be beneficially used and applied for the good of mankind. And I can see no reason for saving the chartered syndicates that have constructed power plants about the Falls, by creating an agitation that will prevent other companies from organizing and securing charters for utilizing the balance of the power now being lost to humanity by lack of the necessary works to obtain this unused energy, which can be made a source of industry, wealth, and comfort.

During the summers of 1903 and 1904 I visited the Falls and its surroundings very frequently, and derived a great deal of pleasure from viewing the magnificent power plants then completed and in progress of construction. But I am not in favor of Americans losing the benefits that they can obtain from the erection of power plants, by giving the Canadian companies the advantage they have discovered they can obtain, if temporarily they can prevent the granting of future charters, concessions, or rights for using the power of the Falls.

The incentive or the basis of all the discussion now taking place, is how to save the present syndicates. The leading agitators are the security holders, who ask for high-paying dividends, and are opposed to the intrusion of other or later competing companies, who would enter the field and sell power at lower figures than themselves.

The Canadian side of the river offers superior advantages over the American, as the total fall they can obtain will, if good engineering methods are followed, amount to over three hundred feet.

IRVIN A. FORT.

North Platte, Neb., February 8, 1906.

Freezing Point of Cod-Liver Oil.

The different treatises on the subject state that cod liver oil should not freeze at zero degrees C. unless it has been adulterated, and in France the Commission of the new Codex has also accepted this characteristic, and it is to be required for medicinal cod-liver oil. But according to the researches of B. Moreau and A. Bietrix it appears that there are specimens of this oil which do not correspond to such case. They observed different samples of oil which were certainly of natural origin, and arrived at the following conclusions. Contrary to the usually-accepted ideas on the subject, there exist at present in commerce among the medicinal cod-liver oils certain absolutely pure oils which are cloudy in winter, because they have not undergone a previous cooling and filtration, and as for all the oils, the deposit only dissolves completely at a rather high temperature. Thus the appearance of cloudiness due to cold does not show an adulteration, but on the contrary is a natural characteristic of pure oils. This cooling of the oil does not seem to remove their active properties. The congealed and non-congealed oils are not found to be different in their usual qualities, as demonstrated by tests for iodine, saponification, percentage of iodine, etc.