Correspondence.

"Distant Water Powers."

To the Edite of the SCIENTIFIC AMERICAN:

An article appeared in your journal of September 22 last under the heading of "Distant Water Powers," which, knowing your usual care in admitting figures to your columns, appears to throw doubt on the value of water powers. Coming from your authority, it has been copied elsewhere. It is, perhaps, not intended to apply to power companies, and the power which they retail at so much per horse power, but to those who, being large users of power, have to consider the relative advantages of a steam plant or of a distant water power and an electric plant and transmission line. No such distinction, however, is being made here, and the article is looked upon as depreciating the importance of water powers, and this is a country where water power is abundant, and is now being largely taken advantage of. We are fast acquiring experience here, and that experience has not been without its difficulties, which have shown that not every water power is valuable for electrical transmission.

I, however, do not wish to go into details, but merely to point out, from United States sources, one or two facts which cast doubt upon your figures and suggest at any rate a revision of your conclusions. A well-known Pittsburg electric company gives the efficiency of the generators as 94 instead of 96; of the transformers as 97½ and 97 respectively, instead of 95 each; and the line efficiency as 89 with the requisite copper, instead of 85. Further, if $86.15 per horse power, delivery capacity, is the cost of electrical transmission equipment without the transmission line, it is greatly higher than we obtain it here and much too high for the most economic work. On the other hand, in regard to steam, Power for November last gives the results of tests of 35 different steam engines for coal consumption, and shows that the best result came from the compound condensing Corliss engines, which averaged 2·36 pounds per horse power per hour with good coal. This for a 12-hour day would be, as the writer points out, 5·17 tons per horse power per annum, which at $3 per ton equals $15.51 per horse power annually, instead of $11.25 which you give. It is not always that we find the best Corliss engines in our factories and not always is the best coal used, and thus the coal cost runs up all the way to $30 per horse power per annum for the 12 hours daily and with coal at $3.

It will interest you further to know that one of our power companies (Chambly) has just sold to the Montreal Street Railway 5,000 horse power at $25 per horse power per annum, and the balance of its power up to 15,600 horse power at, it is said, $15, and all after that at $10, to the Royal Electric Company, which will retail it in Montreal. Again, the town of Orillia, Ontario, offers to manufacturers its own transmitted power, brought from the Severn River, 12 miles off, at $15, but the power being limited in amount, we think this figure too low, although, no doubt, the town expects its return in increased population and increased taxes. At the Shawinigan Falls, Three Rivers, there are preparations going on to deliver power in Montreal, 80 or more miles away, and compete with the Lachine and Chambly companies, which have only 4 and 20 miles respectively across which to transmit their power from the Lachine Rapids on the St. Lawrence River and Chambly on the Richelieu River.

Kingston, Canada, October 27, 1900.

ANDREW T. DRUMMOND.

REPLY TO MR. DRUMMOND.

To the Editor of the SCIENTIFIC AMERICAN:

Your favor of Oct. 30 with that of Mr. Drummond in hand. The article in your issue of Sept. 22 did not attempt to show that water powers are not desirable sources of energy, but simply that it does not pay to transmit their energy to great distances where coal can be had at ordinary prices. The efficiencies named in the article are fully as high as can be expected for good electrical equipment under average conditions of load. The figures of 97½ and 94 per cent, named by Mr. Drummond, cannot be maintained under conditions of practical work. My figures for the cost of electrical equipment per delivered horse power capacity, that is $86.15, are based on $25 per horse power capacity for dynamos and motors, and $10 for transformers. If it can be shown that these prices are too high, I shall be glad to know of it.

The figure of $11.25 for coal $3 per ton, per working year of 3,000 horse power hours, is based on 2·5 pounds of coal per horse power hour, a result that has been frequently and is regularly surpassed in many large plants.

I am aware that electrical energy from distant water powers is offered at very low figures, in some cases, by those who have stock to sell or other interests to promote. I am not able to learn, however, that corporations transmitting electrical energy from water powers to great distances, and selling it in competition with steam power at large plants, are usually able to pay dividends. Good water powers may be of much advantage to industry, but this advantage can only be secured, in a country where coal is cheap, by the location of factories within a few miles of the source of energy, as is the practice about Niagara Falls. For distances of 5 or 10 miles, the cost of the necessary electrical equipment is less per unit of delivery capacity than for distant transmissions. ALTON D. ADAMS.

The Remarkable Trial Trip of the "Variag."

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of August 11 last, you printed a paper on high speed in war vessels, involving comparison of the "Variag" and the "Viper."

At the time this appeared I was at Bar Harbor, and intended to acknowledge it as soon as I returned home, but overlooked it.

I now see that the paper has been reproduced in the Proceedings of the United States Naval Institute, which recalls my attention to it.

Permit me to both thank you for your kind expressions and compliment you on the ability displayed in the paper itself.

Your remark that "on a preliminary trial she is said to have logged for a time the remarkable speed of 24·6 knots an hour," etc., is not as clear as it should be. The word "logged" should not have been used, because the speed referred to was not determined by that method; it was the actual speed between fixed points.

I might also observe that the most important fact connected with the trial of the "Variag" has apparently been overlooked, that is to say, the fact that her performance was effected under natural draft. It is only by keeping this element of the performance in view that its real magnitude can be fully appreciated.

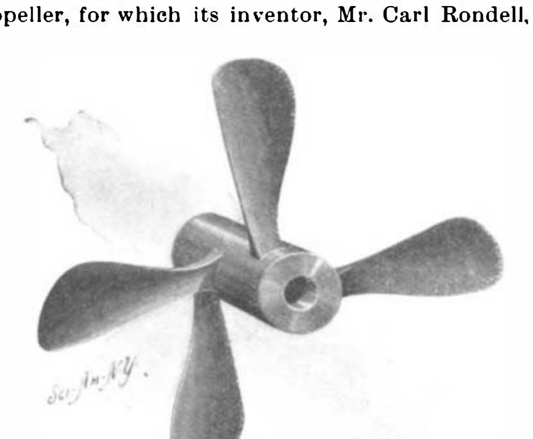
CHARLES H. CRAMP, President.

The William Cramp and Sons Ship and Engine Building Company,

Philadelphia, Pa., November 3, 1900.

A SCREW-PROPELLER OF NOVEL FORM.

Our illustration represents a peculiar form of screw-propeller, for which its inventor, Mr. Carl Rondell, of



THE RONDELL SCREW-PROPELLER.

Stillwater, Minn., claims an efficiency greater than that of the screws commonly employed. Mr. Rondell states that with the ordinary propeller, with its blades arranged to travel one within the path of the other, an air-space is produced by reason of the displacement of the water by any particular blade. As the speed increases, the displacement is more marked and the loss of efficiency, it is said, more pronounced. The salient feature of the present invention is to be found in the arrangement of the propeller-blades, one in advance of the other, or in offset planes, so that the different propeller blades are caused to rotate in different planes, one in advance of the other. By this simple arrangement each blade, it is claimed, will always work in the body of water which has been passed through by the advance propeller-blade, and each blade finds its maximum base of resistance in the water. A maximum of efficiency at very high speeds is therefore obtained.

United States Rolling Stock in New Zealand.

New Zealand has recently placed with one of our well-known firms an order for sixty-odd passenger coaches at a cost of about $500,000, to be built under the supervision of a railway official who is now en route to the United States. The placing of this order has caused much adverse criticism among the labor parties, but the government does not appear to be greatly perturbed. The order calls for specially designed and constructed coaches to suit the narrow-gage railways throughout the colony, and they will be of the latest and most modern pattern, including every up-to-date improvement known to American car builders. It is expected that these coaches will be shipped from New York city in March, 1901.

Mr. Ward, the minister for railways, while in the United States last year, thoroughly studied our railways, coaches, locomotives, and general management, and has, in consequence thereof, inaugurated many reforms in his department.

Engineering Notes.

The Dutch government has ordered 12,000 tons of American steel rails for use in the Dutch colonies of India and Java.

The Bavarian government is having a car built in Nuremberg on the American plan, the woodwork and metal fixtures being sent by the Pullman Company, which also furnished one of its constructors to superintend the building of the car.

In a recent issue of our SUPPLEMENT we mentioned the products of the Elmore Company, in which it was stated that copper tubes 12 inches in diameter, 20 feet long, have been produced by the Elmore process. We are informed that this company has been able to produce tubes 8 feet in diameter and 18 feet long, the tubes being, of course, undrawn. The company produces drawn tubes 12 inches in diameter and 35 feet long.

An explosion of acetylene gas took place at Austin, Ill. A stereopticon entertainment was being given in the First Presbyterian Church, and the operator, who had recently returned from missionary work in India, lost his right hand and sustained other injuries. The gas was in cylinders, and one of them sprung a-leak, and the light that was in the lantern ignited it, causing the explosion. The middle tier of seats, where the tanks had been placed, was wrecked, and the large windows were blown out. The fire was extinguished.

The responsibility for the Boston gas explosion of March 4, 1897, has been placed on the Boston Gas Company. We illustrated the accident in the SCIENTIFIC AMERICAN for March 20, 1897. It will be remembered that twelve persons died of their injuries, and many more were seriously hurt. It is supposed that a spark from a trolley car fired the gas which accumulated in the excavation. The accident naturally entailed a vast amount of litigation, and finally the matter was taken to the State Supreme Court, which has awarded $3,000 for personal injuries to a bootblack, thus affirming the judgment of the inferior court.

The penetration in the Simplon tunnel at the end of June had reached 18,456 feet, and the entirely completed portion was 10,500 feet long. The temperature of the rock at a distance of 7194 feet from the southern end was 92° F., while 10,464 feet from the northern end it was 80°. It is calculated that at the center of the tunnel the heat due to the thickness of the superincumbent rock will be 109°, which would be insufferable to the workmen but for abundant ventilation with cooler air. At the end of August the aggregate penetration was 20,231 feet. The number of workmen employed is 3,000 on the Swiss side and 2,500 on the Italian side.

Coal consumption in blast furances varies with the amount of moisture in the air. In a discussion before the Pittsburg Foundrymen's Association it was stated that under normal conditions with the temperature at 70° Fah., 1,000 cubic feet of air equal to 75 pounds contains 1 pound of moisture, and that each pound of moisture requires one additional pound of coke. Tests have proved that when the air is charged with moisture, from 200 pounds to 300 pounds more coke are required for producing at ton of iron than when the air is dry and comparatively little moisture is blown into the furnace. Heating the air does not eliminate the moisture.

Tests of the corrosion of pipe by the earth along the route of the Coolgardie pipe line have recently been made, says The Engineer. Specimens of pipe, both coated and uncoated, were buried at several different points in November, 1898 and these were dug up and examined on April 24, 1900. In all cases the pipe coating was found to be dry and friable, with a thin film of rust in places on the metal under the coating. There was no pitting of the metal, however. The pieces of uncoated pipe buried in sand or clay were very slightly pitted. A piece of uncoated pipe buried in the "salt lake pan," however, was very materially affected, being covered with pits about $\frac{1}{20}$ inch deep over its whole surface.

A new rail rolling process is in use at the Edgar Thomson Steel Works, at Braddock, Pa. The rails are rolled at a lower temperature than has usually been employed. Formerly the blooms were sent to the rail mill and rolled at a white heat. Almost as soon as they were placed on the hot beds they were sent to the presses, and straightened while at a high temperature. As they were rolled and straightened while very hot, the rails expanded again before cooling off, and much of the toughness of the fiber, which they should have possessed, was lost. It is found that with the new process the tensile strength of each piece was much greater than under the old system. The new process is very simple and consists in "breaking down" blooms while at a cherry red heat, and then sending them into the rail mill and the press. The rails for the Pennsylvania Railroad Company are to be made by the improved process, and as the steel is, of course, much harder to work than when at a higher heat, the engines must be more powerful to roll them.