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**THE SCIENTIFIC AMERICAN SUPPLEMENT**

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## OPENING OF THE NORTHEAST PASSAGE.

Another great geographical problem has been settled by the successful passage of Professor Nordenskjold's expedition through the Arctic Sea to the north of Siberia. A telegraphic dispatch from St. Petersburg, dated May 27, states that the Governor of Yakutsk, Eastern Siberia, has received intelligence from the Vega to May 3, and a later dispatch from Irkutsk reports the safe arrival of the vessel in Behring's Straits. All the members of the expedition were well. Before this account reaches the reader the Vega will be on her way to Europe by way of the Suez Canal.

This expedition, which has thus crowned with successful accomplishment the belief of Professor Nordenskjold that a route to Asia might be found to the north of Siberia, sailed from Gothenburg, July 4, 1878, and arrived at Port Dixon, near the mouth of the Yenisei, August 6. This part of the course had already been proved to be passable at midsummer by Professor Nordenskjold's previous expeditions. The next important achievement was the rounding of the north cape of Asia, a feat never before accomplished, and on the 27th the expedition reached the mouth of the Lena. Here the two vessels parted company, the little steamer bearing the name of the Lena ascending that river, the Vega proceeding eastward, hoping to reach Behring's Straits before the autumn ice drifts should bar the passage. In this Professor Nordenskjold was disappointed, for the Vega became ice bound when within forty miles of East Cape, and was obliged to spend the winter there.

It is safe to anticipate a considerable addition to our knowledge of the Siberian seas when the results of Professor Nordenskjold's observations are made public; the plucky explorer has won a name that will rank with those of the greatest navigators; but there are grave reasons for doubting the fulfillment of his hopes of making known a practicable commercial route through the Arctic Sea from Europe to Asia. The season of open water along the Siberian coast is too brief and uncertain, and the risks are too great, to tempt many to undertake the northern passage, notwithstanding the saving in distance.

## ANOTHER OBJECTION TO THE LICENSE SYSTEM.

One of the worst features of the recently defeated bill for the destruction of the American patent system was that introducing the compulsory license system or its equivalent. The unconstitutional nature of the proposed invasion of the inventor's exclusive right to control a patented invention was sufficiently exhibited in these columns last winter. The matter might be allowed to rest with the victory gained at that time, did not the opponents of inventors' rights threaten to bring it again before Congress at the earliest opportunity. In view of this fact it will pay to make a note of an objection to the license system recently urged by an English writer against a similar provision in the bill now before an English Parliamentary committee—an objection which we do not remember to have seen before. It may be useful some time.

The bill referred to contains a section which compels the patentee to grant licenses to manufacture or use his invention on such terms as the Lord Chancellor for the time being may consider fair. To this provision there can be urged no constitutional objection, as there might in this country; accordingly it is attacked solely on the score of bad policy. It is shown that it puts it entirely within the power of the Lord Chancellor to fix the value of patents of whose intrinsic value he is likely to know nothing. But worse than that, it puts it within the power of wealthy manufacturers to kill any invention that they may fear. Thus the moment a threatening improvement appears—threatening, that is, to inferior manufactures—the makers of the latter may demand a license to manufacture the new article, which they will proceed to do in the worst possible way, placing the new invention upon the market beside their own better made but intrinsically inferior products.

The public, finding the new invention inferior to the old, will be prejudiced against it, and the poor inventor will be unable to counteract the injustice. The products made in accordance with his invention may be the vilest caricatures of what he would make, yet they will bear his name and make it infamous, while he is unable to help himself. The chances are that where one inventor would willfully suppress or ask an exorbitant price for his invention or its products under the present system, a score of useful improvements or radically new additions to the world's resources would be stamped out of existence under the license system. The proposed change is as obnoxious on the score of public policy as on the score of abstract justice.

## HOW COFFEE IS CLEANED.

When coffee was retailed in its natural condition, and roasted in small lots over the kitchen fire, imperfect beans and impurities were picked out by hand. With wholesale roasting more expeditious methods were necessary, and machines were invented to do the work with greater economy and dispatch. From this necessary operation, to the invention of processes for polishing and coloring inferior goods, to make them look like prime coffees, was but a step. The poorer grades of coffee were washed in colored water, and then treated to a course of polishing with powdered soapstone, which gave the beans the glossy and flinty appearance of first rate coffee and covered up all defects. The natural result was to make all honest dealers suspicious of polished coffees, though the need of machine cleaning was in no way diminished. It is possible, however, to have coffee cleaned and polished by machinery and at the same time be honest.

By this process the coffee is put into a large cylinder capable of holding eight or nine hundred pounds, the cylinder being lined with heavy linen and provided with cleats to increase the friction, when the beans are set in motion by the rapid revolution of the cylinder. At one end of the cylinder are a number of holes to admit air, and at the other a suction fan making about two thousand revolutions a minute. The friction loosens the dust and the outer covering of the coffee, which impurities are carried away by the air current set in motion by the fan. After ten or fifteen minutes of this treatment the coffee is wet with pure water and the machine again set in motion. The coffee is thus washed, and after half an hour's scouring comes out entirely clean and much improved in appearance by the polishing it has received. Coffees which contain much loose dirt and many broken beans are subjected to a preliminary process in which the perfect beans are winnowed clean, after which they are treated as already described.

## ROBERT CRAWSHAY.

Robert Crawshay, the iron king of Merthyr Tydfil, Wales, died at Cheltenham, England, May 10. The London correspondent of the *Times* tells at great length the story of the foundation and wonderful development of the vast establishment which grew up under the wise management of Robert Crawshay, his father, William Crawshay, and his uncle, Richard Crawshay.

The last named had already acquired a forture in the hardware business in London, when he purchased the controlling interest in the iron works at Cyfarthfa, in the vale of Merthyr Tydfil. Soon after, by the retirement of one partner and the death of the other, Mr. Crawshay became sole proprietor. This was about the time of the American Revolution and the beginning of England's rapid industrial development.

While Richard Crawshay was pushing his works along, he heard that a certain Henry Cort was working a new process of puddling iron, at some small foundry near Gosport. Crawshay went there, approved of the method, returned to Cyfarthfa, and built works both for puddling and rolling on Cort's plan, paying the patentee 10 shillings for every ton of iron turned out under his process. Among other improvements and extensions of the works, Richard Crawshay erected a water wheel 50 feet in diameter, 80½ feet in breadth, with a weight of gudgeon of 100 tons. The magazines and scientific papers of the time described the wheel as one of the modern wonders of the world. It was made by a local engineer named Watkin George. It used 25 tons of water per minute. The remains of this giant of the past may still be seen on the Taff. Crawshay gave this Watkin George a share in the works—a partnership in those days was more easily managed than it is now, when money is considered more than brains—to extend over a period. When George went out, some dozen years afterward, in addition to salary, he received his share of $500,000 profits. Mr. Crawshay took in other partners at various times, and at his death the disposition of the Cyfarthfa Works was three-eighths to Benjamin Hall, two-eighths to Joseph Bailey. Richard Crawshay died worth £1,500,000, a fortune far short of that made by his nephew, who, besides his Cyfarthfa interests, had vast iron properties in Monmouthshire. When Richard Crawshay died, Hall and Bailey retired, and the works came into the possession of William Crawshay, who, with Sir Joseph Bailey, had practically managed them for several years.

Under this new iron king, who had a genius for invention, Cyfarthfa advanced with gigantic strides. In 1819 it numbered 6 blast furnaces, and in that year produced 11,000 tons of pig iron and 612,000 tons of bars. In 1821 it turned out more of these manufactures than the three kingdoms put together had done between the years 1740 and 1750, and fully half the total yield of all Great Britain so late as 1788. From 1817 to 1840, the Glanmorganshire Canal, which the first Crawshay had started, carried from Cyfarthfa 613,144 tons of puddled iron. The most important of the rolling mills was erected in 1846, designed by William Williams. Attached were 18 boiling furnaces and 20 puddling furnaces, which, in March, 1847, turned out 6,144 tons of rails, and in the same month the largest bar of iron possibly ever made. It measured 27 feet long and 6½ in diameter, and weighed 2,941 tons. In his old age, William Crawshay retired to his seat at Caversham Park, near Reading, on the Thames, having, however, built Cyfarthfa Castle, a magnificent residence near the works. He left his son, Robert, in charge, and dying in 1867, bequeathed him all his property, which, besides other valuables in lands and gold, including Cyfarthfa, with its 11 furnaces—7 at Cyfarthfa proper and 4 at Ynysfach—7 ironstone pits, and 8 coal pits. The estimated fortune of William Crawshay was £35,000,000. When the last great strike in the iron and coal trades of South Wales took place, Robert Crawshay closed his works, declaring that he would close his furnaces forever sooner than submit to the dictation of his men, and they have only been partially reopened since. At one time the works employed 5,000 men.

## TRIUMPHS OF MODERN ENGINEERING.

In an address on the Past, Present, and Future of Engineering before a recent meeting of the Engineering Society of the School of Mines, Columbia College, Prof. W. P. Trowbridge said it was a remarkable fact that nearly all of the great achievements in engineering had been accomplished