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SCIENTIFIC AMERICAN SUPPLEMENT

No. 825.

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RELATIONS OF FOREIGN TRADE TO THE METRIC SYSTEM.

Several British consuls have recently warned their countrymen they were losing considerable trade in foreign countries owing to their persistent use of English weights and measures in their circulars and price lists, which were perfectly unintelligible to most of the foreign dealers, whereas their French, German, and other competitors used the metric system, which was familiar to everybody, and naturally attracted custom.

The consuls have declared that the British manufacturers are simply playing into the hands of their rivals by persisting in the use of figures which to many foreign merchants are so many hieroglyphics.

These warnings apply equally well to the exporters of the United States, and for their further guidance we here subjoin an alphabetically arranged list of the principal foreign countries in which the metric system is now used:

Algeria, Argentine Confederation, Austria-Hungary (Bohemia), Belgium, Brazil, Canary Islands, Chile, Colombia, Cuba, Denmark, Ecuador, Egypt, France and colonies, Germany and colonies, Greece, Guatemala, Honduras, Iceland, Italy, Malaga, Manila, Mexico, Mozambique, Netherlands, Norway, Paraguay, Peru, Portugal, Russia, Turkey, Spain and colonies, Sweden, Switzerland, Venezuela.

The use of the metric or decimal system was authorized by our laws many years ago, but the use has not yet been made compulsory, hence the majority of people cling to the old system and dislike to change, although the metric is more simple and easily understood. Our coins and monetary calculations are based on the decimal or metric system. Ten mills make one cent, ten cents make one dime, ten dimes make one dollar, ten dollars make one eagle. This is plain and simple, everybody is familiar with it, and probably nothing could induce our people to go back to the old style of pounds, shillings, and pence, which formerly prevailed in this country, and is still current in England. The extension of the decimal or metric system to our weights and measures is urgently needed and can be readily effected. Ten millimeters make one centimeter, ten centimeters make one decimeter, ten decimeters make one meter, and so on. This is far easier and simpler than to reckon measures as we now do, three barleycorns make one inch, twelve inches make one foot, three feet make one yard, five and a half yards make one rod, forty rods make one furlong, eight furlongs make one mile, and so on.

The metric system is so much more convenient, saves so much time, and has now become so generally adopted throughout the world, that the United States ought no longer refuse to fall into line. A very little pressure would suffice to bring about the change. It would do the business, probably, if Congress were simply to pass a law requiring that estimates, contracts and bills, specifying weights or measures, when not made out metrically, must bear a revenue stamp of one dime. Rather than pay a small tax, everybody would at once use the decimal system, and the change would be as smooth as the system itself.

LARGE CASTING AND LARGE FORGING.

The largest casting ever made in the United States was poured on the 13th of October, at the Bethlehem Iron Company's Works, Bethlehem, Penn.

The Hon. Secretary of the Navy, Benjamin F. Tracy, accompanied by Commodore Wm. M. Folger, U.S N., Chief of the Bureau of Ordnance, arrived in the city the evening of the 12th, and during the forenoon of the 13th, surrounded by the officials of the works, as well as the two naval lieutenants who look out for the government's interests at this place, they proceeded to the forge building. The scene was a busy one; the hum and shriek and roar of machinery re-echoing through the works. Locomotives darted back and forth, drawing trucks which carried huge ladles of white-hot, molten metal. The company assembled on the platform of the open-hearth furnaces to witness the pouring.

The mould had been prepared by digging a large pit and lining it with an iron bottom, to support the great weight of the casting. The patterns had been placed and well packed with moulding sand, and, when they had been withdrawn, the mould was braced in every conceivable direction by tie rods and braces. The top of the mould came just even with the floor of the building, and was thoroughly packed in with dirt, and all leveled off. Along this dirt floor were various troughs of iron, lined with composition.

At each end of the mould stood an immense ladle, containing over forty tons of molten metal. To one side was the railroad track, on which, by the aid of five locomotives, were drawn the twelve trucks, each truck carrying a ladle containing about nine tons of molten metal. When these twelve ladles were in place, in front of each could be seen a trough leading to the mould. On signal from Mr. John Fritz, the general manager, the two large forty-ton ladles were started, by side tapping, and two large streams of molten metal roared toward the mouth of the mould. A moment later, and each of the twelve truck ladles tilted forward and poured their tribute into their troughs, and thence into the mould.

The fourteen streams of bright metal, the glowing tops of the ladles, and the showers on showers of sparks made a brilliant sight in the gloomy foundry. Not an accident occurred, not a moment's delay marred the proceeding, so well planned was the undertaking, so carefully had each item been looked after.

The finished casting will weigh about 330,000 lb., or about one hundred and fifty tons. Of course much more metal than this was poured to allow for sinking heads, troughs, and overflows. This is the largest casting ever made in the United States and probably the largest in the world. It is to be a part of a machine which will be used in the manufacture of war material for the United States. The casting will be left in its mould for a couple of weeks or until it is perfectly cooled.

The second event of great importance witnessed by the Hon. Secretary was the forging of a tube for a thirteen inch gun.

The compressed steel ingot had been bored to an internal diameter of about ten inches, its external diameter being about fifty inches. This ingot had been placed in the gas heating furnace and when taken out it was of a good welding heat. A mandrel had been placed through it and each end of the mandrel was supported by a chain hanging from a hydraulic traveling crane. These cranes, moving foward, soon brought the ingot under the large No. 1 Whitworth forging press. The ram of the press descended slowly, but with the force of many tons of hydraulic pressure, and the hot steel of the ingot gave way and was pressed down. The ram lifted and the ingot was turned or rotated slightly. The pressure was again applied, and so, stroke after stroke, the steel was kneaded, and the ingot was gradually worked down to a long tube. This tube in the rough, when it left the press, was about twenty-six inches in external diameter and eleven inches in internal diameter, thus leaving walls about seven and a half inches in thickness. It is about forty-two feet long.

The ingot from which this tube was made was cast in the Whitworth fluid compression mould, which aids in producing a homogeneous steel, free from blow holes, pits, cracks, and seams.

This tube will be rough-machined and then annealed and oil-tempered several times. Then test bars will be taken from it to see if it has the proper physical qualities, and chemical analyses made of specimens to determine the amount of carbon, silicon, sulphur, phosphorus, and manganese it contains. After passing the tests made by the government inspectors, it will be sent to the gun factory at Washington, D. C., where, with a suitable jacket, hoops, breech plug, and mechanism, it will be assembled, forming the largest modern high-powered breech-loading built-up gun that this country has produced. The assembling of guns at the Washington gun factory was fully described in the SCIENTIFIC AMERICAN for February 28, 1891.

The New Cunarders.

The new trans-Atlantic steamers which are to be built for the Cunard line are naturally attacting considerable interest in shipping circles. It is reported that the Fairfield Company's yard is already being cleared for the work on one of them, and that materials used in the early stages of construction are already prepared; though the construction of the vessels will be pushed with all possible speed, they will not be ready for service before the summer of 1893. It is reported that the ships are not absolutely guaranteed to be five-day boats, but 21 knots an hour in the open sea is guaranteed by the builders, and if pushed hard it is probable that they will make a much better record. It is stated that the Fairfield Company, who are to build these boats, offered to give the Cunard Company vessels capable of an average of 22½ knots per hour, but as considerable space for the accommodation of first-class passengers would have to be sacrificed in order to obtain this speed, the Cunard Company decided to be satistied with a little less speed and a better-paying boat. Provisions have been made in the design for the accommodation of 600 first-class passengers, nearly a third more than the Teutonic or Majestic.

White Cement.

White cement of the same character as Portland cement is made by grinding together three parts of chalk and one of kaolin, burning at a red heat and grinding again. The cement made by this process hitherto has shown a tensile strength only about one-half as great as that of good Portland cement, but it has the hydraulic quality and other characteristics of Portland cement, and it is to be hoped that the manufacture may be so improved as to increase the tensile strength to the point required for making artificial stone. If a white cement can be found for a matrix it will be easy to obtain aggregates of light color by utilizing white sand, marble dust, white talc, and so on, suitable for making a concrete which could be used in place of marble.