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CONDITION OF THE LABORING CLASSES IN MEXICO.

The discontent following the recent years of business depression has caused us to look about with a view to drawing comparisons with the social and commercial conditions of other nations and especially of those whose natural advantages, climatic, physical or political, bring them into comparison with our own people. We have involuntarily turned our eyes to Canada and Mexico, and especially toward the latter, owing to the fact that silver has been made the standard of value in that country, and because during the campaign of 1896 many allusions were made, by political speakers in various parts of the country, to the great prosperity of this neighboring republic. With a view to ascertaining the true condition of affairs as touching the civilization and social and commercial conditions of Mexico, Mr. Theodore C. Knauff made an extensive trip through this country. The question so often asked was, "Why is it that the Mexican peon, with his sixty cents a day, is making more than the American farmer with all his knowledge and invested capital?" In the current issue of the SCIENTIFIC AMERICAN SUPPLEMENT we publish in full Mr. Knauff's lecture recently delivered under the auspices of the Franklin Institute, in Philadelphia, in answer to this question.

The author explains how little conception the ordinary citizens of the United States have of the extent of or even the natural and physical conditions which prevail in Mexico. The ignorance of our people concerning our neighbor of the south is almost incomprehensible. A map of Mexico projected on a map of the United States of the same scale extends from Maine to Texas. Mexico is sixteen times the size of New York State. Sonora equals Iowa and Ohio combined. Chihuahua equals Pennsylvania and New York combined. Mexico's mountain system is a continuation of the Andes, and widens out into two ranges, leaving in the middle a high flat table land from 4,000 to 8,000 feet above the level of the sea, while many volcanic peaks reach an altitude of 18,000 feet. The city of Mexico is 7,469 feet above sea level or nearly 1,200 feet higher than Mount Washington. Its inhabitants feel the altitude and the great dryness and rarefication of the air. The population of Mexico is about 12,500,000. The lecturer states that two-thirds of this number have never slept in a bed or worn stockings, and that they are able to live at a less expense per diem than it takes to keep the meanest farm horse. Many of the inhabitants wear a single garment called a "sarappe," or thick woolen garment, with a hole at the top through which the head is inserted. This garment forms at the same time the Mexican's coat, hat, and even his bed. The feet are usually bare or clothed in domestic sandals. The women wear a kind of cotton shawl over the head and shoulders, called a "robosa." "The Mexican farm laborers' conditionsare inferior to those of the late slaves of our Southern States. Their huts have but one opening, no windows and dirt floors. When wishing to go to bed, they simply unroll their mats, and, without removing their clothing, lie down and go to sleep. The laborer has a certain wage and is given time and place to build himself a house. If he does not build it he has nothing with which to cover his head. The houses are built by the people who live in them. Some of the houses are mud roofed and others roofed by palms or banana leaves or some fiber that will shed moisture when necessary."

These adobe houses are made of large blocks of mud pressed into shape in a mould and then hardened and baked in the sun and laid in flat layers, one on top of the other. This method of construction makes quite a substantial building, which requires a long time, even in the rainy season, to become watersoaked. A church and plaza are required before a settlement can become a city. There are shops in the cities, but the business is largely conducted by peddlers and sidewalk merchants. It is a common thing to see a man working a modern sewing machine in the streets. All branches of trade are carried on outside of the houses. In the cities the houses of the better class are made of stone. Among the rich the rooms are furnished in great magnificence. Mexico is at the same time a land of millionaires, for the land is most unevenly divided among the people. Out of the total population of over twelve million, six thousand people own all the land, "with influence enough," says the lecturer, "to avoid practically all taxation, which falls on the poor." There is no "middle class," so called. The railroad by which one travels passes through one estate for a distance of eighty miles, which enormous landed property belongs to one individual. In another place is an estate of 1,500,000 acres, in another one of 250,000 acres. "At present," says the lecturer, "there is no possible danger of an uprising of the people, because the people are perfectly contented in their lot." If the peon has a few coppers in his pocket, he is perfectly happy, and does not feel compelled to go to work until he is driven to it by hunger or necessity.

Mr. Knauff not only gives a picture of the life, habits and customs of the people, but he also depicts at length the commercial growth of the country, its products and manufactures.

For several years American merchants and manufacturers have made earnest efforts to enlarge our trade with Mexico—especially since the completion of the direct all-rail route from the Rio Grande to the city of Mexico—and the commercial travelers and leading merchants of our principal cities are pretty well acquainted with the commercial and social conditions as they are and have been in Mexico. There has been, within a comparatively recent period, some improvement in this trade, and, owing to the introduction of American capital in mining and other enterprises, and an infusion of American enterprise in some departments of industry, there has been better promise than ever before that Mexico was in some degree awaking from its long period of lethargy. The decline of the past five years in the price of silver has, however, proved a serious setback to the progress of Mexico, for to this extent has been enhanced the price of all imports—silver being the main product and the standard of money of the country; and in like ratio has also been increased the interest payable on the national debt. The value of the imports for the year ended June 30, 1896, was $42,253,938, and the exports for the same period were $105,016,902, and the total debt of the country in American money was $213,600,000. Yet Mexico has now in operation about seven thousand miles of railway and over forty thousand miles of telegraph, nearly all of which is of comparatively recent construction, and, notwithstanding the decline in silver, there are many encouraging signs for those who have been so long looking for a better development of her industries and increased trade between Mexico and the United States.

THE SUPREMACY OF THE STEAM TURBINE.

If the compound steam turbine fulfills its present promise, it is likely that in certain branches of engineering it will hold absolute possession before many years have passed. It is announced in the Russian press that the Russian Admiralty has placed orders with the firm of Hawthorne, Leslie & Company, of Hebburn-on-Tyne, England, for the construction of two 38-knot torpedo boats built on the model of the Turbinia and propelled with turbine motors working on four shafts, each of which carries three propellers. This is eight knots faster than the fastest torpedo boat destroyers in the British navy.

Just how much courage is required on the part of the naval architect who signs his name to a contract for a 38-knot boat—38 knots is 44 miles an hour—is evident from a comparison of figures. The 300-ton "destroyers" just mentioned require 6,000 horse power to drive them at 30 knots an hour. At these high speeds the resistance of the water increases as something more than the cube of the speed. The cube of 38 is more than double the cube of 30, and hence the 6,000 horse power of a 300-ton destroyer would have to be raised to over 12,000 to enable her to catch one of the new torpedo boats. But 12,000 horse power reciprocating engines of the common type, with the necessary boilers and coal, would sink a 300-ton torpedo boat, supposing they could ever be stowed away in her hold.

Evidently then a speed of 38 knots involves a radical change in the accepted methods of propulsion. Some form of motor is necessary in which the weight per indicated horse power shall be reduced to a very low figure. Indicated horse power is the product of steam pressure and piston velocity. If either or both of these be increased, there will be a proportionate increase in horse power without a proportionate increase in weight. In the present type of high speed marine engines the steam pressure is as high as can be used to advantage, and the piston speed is as great as the reciprocating type of engine will allow.

The present year has seen the advent of a phenomenal little boat, the Turbinia, in which the problem appears to have been completely solved for speeds from 30 to 40 knots an hour. Steam turbines of the type designed by Mr. Parsons, son of Lord Rosse of telescope fame, were substituted for the ordinary reciprocating type of engine, and by driving them at a speed of 2,100 revolutions per minute, 1,576 horse power was realized from an engine weighing only $4\frac{1}{10}$ tons, or $5\frac{1}{10}$ pounds per horse power. As the total weight of all the machinery and boilers is only 28·7 tons, the turbines develop 55 horse power for every ton of machinery, and 384 horse power per ton of engines. Compare this with the latest battleships, which develop only 9½ horse power per ton of machinery, and 27 horse power per ton of engines.

In the trials just mentioned, the Turbinia's engines were handicapped by too small a steam pipe, the pressure being 200 pounds at the boiler and only 130 pounds at the turbines. This was remedied, and subsequent trials gave a speed of 35 knots with 2,400 indicated horse power. The corresponding figures for this horse power would be 83½ horse power per ton of all machinery and 585 horse power per ton of engines!

One feature that renders these turbines so unusually promising is their remarkable economy. The consumption of steam per horse power hour is only 14 pounds, as against from 18 to 21 pounds for the most economical reciprocating engines, working under favorable conditions. It is evident that at the present